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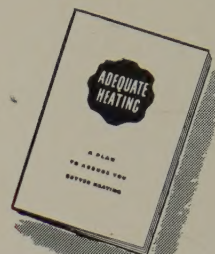
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RAIC JOURNAL

Serial No 340, Vol. 30, No 12 EDITORIAL, Earle Morgan

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EDITORIAL

IT IS SO EASY FOR ARCHITECTS to be complacent with such prosperity in the profession, and such cause for confidence of even greater expansion and development of our country in the years to come. We hear and read, and we can see, that Canada is the present great land of opportunity. The picture is very bright but are we, as architects, taking full advantage of our good fortune?

I am reminded of the seeming philosophy of a good many architects about vacations. When we are busy we cannot afford the time, and, when we have little work, we cannot afford the money. Are we now so busy with large projects that we have not time to see the present path of architecture, and where it will lead in the years to come? Are we all too busy making architecture big business, and forgetting its contribution to the nation's welfare and culture? Are we grinding out copies without enough thought, research and honest effort to obtain the best in buildings simply because we can keep our offices busy without it? If this is so, it is a sobering thought and question to take with us into the coming year.

It may not be very apparent, but the present state of prosperity is reflected in the contents of your *Journal*. There were times, during the unhappy days of the depression, when your editorial board had to reach to the bottom of the barrel for photographs of buildings, but architects had time to write articles and contribute their various talents to the success of the *Journal*. The situation has now changed. As the volume of work increases, the architect has less and less time for writing. Professional and commercial magazines in the technical fields in North America must all have experienced the difficulty of obtaining articles. The *Journal* is no exception, but a review of the year's work will show that the busiest architects still feel a responsibility to write, or send us valuable papers given by others. I cannot appeal to them to continue too strongly and for others, including provincial secretaries, to follow their example.

At the turn of the year, we should give some thought to the future of architecture. The traditionalist uses something that is static. Something that is time-tested and safe from criticism. Safety of that kind has a wide public appeal, but that is not the way of progress. Contemporary designers should abandon all obsolete or useless links with the past and solve their own problems, but there is abundant evidence that this ideal is not always followed. There are many so-called modern buildings that are just as slavish copies, though of a much more recent past, as the Georgian house. What other explanation can be offered for a Californian solution to a building problem in the rigour of a Canadian winter, or for a great, upswept roof overhang on the west side of a house in Toronto? We should develop a Canadian architecture by the simple expedient of solving our own problems in the best way, changing as time, conditions and materials themselves change.

By tradition, the December editorial is by the chairman. It is his only opportunity to give full public expression of his keen appreciation of the work and effort given by all members of the editorial board, the provincial representatives, the editor, the publisher and his staff, in making your *Journal* possible. It is my pleasure to extend, on their behalf, best wishes to all readers and advertisers for a Merry Christmas, a Happy New Year, and better architecture throughout all Canada.

EARLE MORGAN
Chairman of the Editorial Board

PERFORMANCE STANDARDS FOR RESIDENTIAL ZONING AND SUBDIVISION CONTROLS

A Master in City Planning Thesis
K. Izumi

INTRODUCTION

CONSIDERING THE CIRCUMSTANCES OF EVOLUTION, most zoning and subdivision regulations are a reasonable and fair attempt to deal with a complex problem. But, the results of residential development under present controls leave much to be desired. It is probably impossible to prohibit "bad" design or to pass a fiat that a certain design must be followed. However, it is desirable and highly possible that what controls we have could be more "positive" in effect to encourage and facilitate good imaginative design.

Further, this new approach to controls, with the necessary flexibility is a must if we are to take advantage of the past, present and future technological developments; to keep up with and give expression to the ever-changing and improving "way of life"; and to maintain as much as possible the individual's freedom of choice and expression, above all in his own home. Then, and only then, will we be able to reap the profits of the cost-cutting devices offered by technology; to give expression and spread the benefits of the good features of the diverse "way of life" so far limited to the select few; and to make available the variety of lots and dwellings to the mass.

To help accomplish these ends, first, the controls should not place limitations on good design as do the present regulations. While establishing a minimum, they should not prohibit the "maximum". Second, the provisions need to be couched in terms, quite definite but also "suggestive". For example, instead of a specification for a roadway reading, "required a 20' width pavement", it could be stated in this fashion, "required two moving lanes of 10' width each". While just as if not more specific, the latter conveys another message. "Two moving lanes" says quite definitely that they are not for parking and implies need for providing additional space for this purpose. Admittedly, should off-street parking be desired, this should be stated, but it is obvious that the direct reference to performance is precise and more positive as a means to stimulate and encourage thinking of better designs.

Intent and Scope of Thesis

Intent

The intent of this thesis is to show that the "perform-

ance approach" in evolving zoning and subdivision regulations will help to fulfil the need discussed in the foregoing.

In the course of the following, many "value" judgments are made which warrant more thorough research and discussion but for reasons of limitations of time and research facilities, these are not undertaken. For illustrative purposes only, many of the figures proposed and used, particularly those relative to spatial requirements, are comparable to those of prevailing practice. This is to facilitate the illustrative comparison contained later and should not be assumed that they are the standards advocated.

In several instances the reader will differ with respect to the use of a particular "Standard" but where these seem significant, they are noted and briefly discussed.

Scope

To illustrate this "Approach" in reasonable detail, the portion that the thesis covers is the physical design of that type of residential area usually classified as "A", "RI", "RAI" and so on, signifying the "highest" form of dwelling areas. These are the areas limited to the so-called one-family detached houses. Since design restrictions become more real as the lots get smaller, about 7,000 square feet and under, specific interest is shown in these types of lots.

Since the basic element of any residential district is the individual unit composed of the dwelling, its yard and access street, the requirements of this "unit" should be paramount in establishing any regulations to control its design. Therefore, the analysis is centred on this unit, basing any proposals or recommendations for controls mainly from this point of view. As a matter of fact, some factors important to the unit affect the larger residential area directly and vice versa. Where these occur, they are discussed with necessary qualifications.

The Present Situation

The major drawbacks of present regulations are mostly due to the assumption that the same regulation will have the same effect on every parcel of land with which it deals. This has led to the resolution of control measures to exact spatial dimensions. Also, for reasons of administration, this was thought to be the best. But, a recent survey shows that 62 out of 68 cities have had to grant variances to these

rigid requirements.¹ It should be obvious that a 30-foot set-back requirement on a 100-foot depth lot has not the same effect as the same set-back on a 150 or even 110-foot depth lot. Similarly, a side yard aggregate width requirement of

12 feet on a 50-foot width lot presents difficulties infinitely greater than the same restriction on a 70 or even a 55-foot lot. The cumulative effect has a discouraging effect on the designer and the result, to say the least.

THE PERFORMANCE APPROACH

This approach is not unlike the method used by the up-to-date specifications of many engineering societies and institutes.² For example, the specifications for designing a typical floor are usually stated as follows:

1. Live load requirement in lbs. per square foot,
2. Fire resistance rating in degrees per hour,
3. Sound insulation rating in decibels, and so on.

With these, the designer is free to choose the type of material, the method of construction, the design formulas and so on. Hence, he is able to evolve any span or bay system, thickness of floor, finish, etc., to suit his design, so long as he fulfils the basic performance requirements of supporting the live load, resisting fire for the required number of hours, providing the proper amount of sound insulation, etc.

This is comparable to specifying the number of moving lanes, parking facilities required, pedestrian ways, buffer and planting strips, etc., for the design of the street right-of-way instead of stating the exact width for the street and pavement. With the former, the designer has some freedom to decide what combination will best suit his design.

It is indicative of the validity of this approach to note that Mamaroneck, Westchester County, New York,³ has legally adopted a "performance type"⁴ building code for one and two-family dwellings. This is in direct contrast to most existing building codes which set up rigid specifications. For example, these may require walls to be of a certain thickness even though a lighter construction may prove to be just as, if not more, effective to adequately support the weight or to provide the necessary insulation.

The Factors to be Considered

The difficulty in evolving this type of specification for zoning and subdivision controls lies in the proper segregation of factors, to gather together under a specification all those elements with a common denominator. However, for ease of analysis, the factors to be considered are cast as shown in the table. They are placed in order of their relative capacity (number of ways) to influence the physical design of the "unit". The social policy is singular, that is to say, society agrees usually to a standard or a group of standards, so it is assumed that the social policy makes a "singular" impact. On the other hand, since there is no agreement in the same sense, technology's influence on design varies as to what and how much is used. Similarly, the "way of life" has diverse influences, varying as to the habits, customs, social status and so on, of the party concerned.

PHYSICAL DESIGN STANDARDS FOR LOT — DWELLING — ACCESS

SOCIAL POLICY

Provisions of the police power as expressed, for example, in the standards of bodies such as the American Public Health Assoc.

TECHNOLOGY

Household Equipment
Building Materials and Methods
Architectural Detailing
Others

WAY OF LIFE

Social Progress
Customs and Fashions

SITE CONDITIONS

Topographical
Vegetation
Soil
Contours, etc.
Climatological
Sun
Wind
Rainfall
Snowfall, etc.
Views

PERSONAL DESIRES

Availability of choice
Freedom to develop site

Site conditions are next in this hierarchy, the various elements changing from lot to lot, region to region, placing to another degree its demand on physical design. Finally, as the manifestations of the personal desires are infinite in number and least accountable, it is placed at the bottom.

A study of this hierarchy shows that as we progress from the top down, we need greater flexibility in our controls. In other words, the certainty of the grounds for control decreases and hence a wider latitude is necessary. The point of departure for further analysis suggests itself, the

¹ Burnham, O. W. and Johnson, M. E., "The Use of Special Exceptions in Zoning Practice", (M.C.P. Thesis, MIT, 1951) p. 47.

² The manuals and handbooks of the American Institute of Steel Construction (AISC), the American Welding Society (AWS), the American Society for Testing Materials (ASTM), the American Concrete Institute (ACI), the British National Research Board are a few.

³ Boston Post Traveler, Nov. 23, 1951, news item.

⁴ The BOCA (Building Officials Conference of America), NAHB (National Association of Home Builders) have published a basic building code and a plumbing code of the performance type respectively.

The National Board of Fire Underwriters, the American Institute of Architects, American Public Health Association have also made contributions.

social policy which has the least diversification. Hence the analysis proceeds as follows. A desired set of provisions, reflecting the social policy is assumed. Next, these are augmented by the demands of technology and the "way of life". Then the site conditions are taken into account and finally the requirements of the personal desires noted. From the results of the demands of each on the physical design of the dwelling unit, its yards and street access, suggestions are made as to the type of provisions which will best accomplish the desired ends.

The Social Policy

Any social policy is derivative of the economic, political, technological and myriad elements which form the social "climate" of the time. However, the "timeless" considerations are put forth in the constitutional basis for the police power which states that regulations must be "to secure the health, safety, morals, comfort, convenience and general welfare of the community."¹

At any given time these are expressed by minimum space and other standards for housing evolved by various governmental agencies. In general, the standards recommended by non-governmental agencies tend to be more generous. For this thesis, the provisions as set forth by the American Public Health Association, Committee on the Hygiene of Housing are assumed to reflect the social policy. These are published as "Standards for Healthful Housing", in three volumes titled:

- Planning the Neighborhood (1948),
- Planning the Home for Occupancy (1950),
- Construction and Equipment of the Home (1951).²

The following are the various considerations culled from their text,

For the Dwelling Unit

1. A dwelling unit for each family in any residential area based on social and psychological needs.
2. Adequate dwelling space:
For one person..... 400 square feet.
For two persons..... 750 square feet.
For three persons..... 1,000 square feet.
For four persons..... 1,500 square feet.
For five persons..... 1,400 square feet.
For six persons..... 1,550 square feet.
3. Provision for household activities, personal and family.
4. Provision for suitable conditions of temperature, and light:
Winter heating,
Summer cooling,
Ventilation,
Daylight.
5. Provision for sanitation and health.
6. Provision for privacy and personal satisfaction.

For the Lot

1. Protection against noise, odor and invasion of privacy.
2. Provision of natural illumination.
3. Provision of cross and through ventilation.

¹ Bassett, E. M. "Zoning", (Russell Sage Foundation, N.Y., 1940) p. 13.
² Public Administration Service, 1313 East Sixtieth St., Chicago 37, Illinois.

4. Provision of adequate egress, access to street, access to rear of lot.
5. Provision of optimum size and use of lot for:
Outdoor living space,
Play space for pre-school children,
Space for drying and airing of clothes, etc.,
Space for off-street parking.
6. Provision for other facilities on the lot:
Garage or carport.
Porch and/or garden shelter,
Storage shed,
Workshop,
Incinerator,
Garbage can shelter.
7. Provision for adequate relationship to adjacent lots and dwelling units.
8. Provision for proper ground drainage.

For the Access Street

1. Access street, easement or other public way for:
 - a. Public utilities :
Sewerage lines,
Water supply,
Gas lines,
Power lines.
 - b. Public service :
Street cleaning,
Snow removal,
Garbage collection,
Access for ambulance, fire fighting apparatus and other emergency services,
Access for delivery of mail, fuel, etc.
 - c. Automobile and other vehicles :
Adequate space for movement,
Parking facilities,
 - d. Pedestrian ways :
Sidewalks and crosswalks.
 - e. Others :
Planting,
Street lights,
Hydrants,
Mail boxes, etc.

Many of the above items requiring space are automatically provided for when adequate space is apportioned for the lot and street. The important space provisions are the space standards for the dwelling unit starting from 400 sq. ft. for one person to 1,550 sq. ft. for 6 persons. The space required for other structural elements on the lot will be fairly constant.

For one garage or carport, 250³ sq. ft. are needed, for two, 400 sq. ft. In addition, another 150 sq. ft. should take care of the other items, making totals of 400 to 550 sq. ft. which

³ The variable here is dependent upon many factors of a regional, cultural and other bases. For example, the availability of good public transit to educational, shopping, recreational, etc., facilities will affect the number of cars the family will have. The fact that in Los Angeles the ratio of cars to people is about 1 to 2, while the average in other cities (like Winnipeg, Canada) is about 1 to 8 indicates the need to take into account lot space requirements for cars. The use of 400 sq. ft. for two cars in the above is purely for convenience and should not be construed to mean that the thesis recommends these space allocations indefinitely. The possibility that cars will be smaller or larger cannot be ignored.

need to be added to the space required for the main dwelling unit.

The space requirements for outdoor living facilities and other purposes are highly conjectural. The author makes a value judgment and suggests the relation to be twice the floor area of the total building space, for purposes of illustration. This makes the total lot requirement, three times the total building area. (This is an estimate made from a perusal of published designs which are thought to have an optimum relationship of open to closed space.)

The following table then shows the minimum lot areas evolved for the various space standards for the dwelling unit. The maximum requirements of 550 sq. ft. for other building space requirements is used in all cases.

For one person	(400 plus 550)	3=2,850 sq. ft.
For two persons	(750 plus 550)	3=3,900 sq. ft.
For three persons	(1,000 plus 550)	3=4,650 sq. ft.
For four persons	(1,150 plus 550)	3=5,100 sq. ft.
For five persons	(1,400 plus 550)	3=5,850 sq. ft.
For six persons	(1,550 plus 550)	3=6,300 sq. ft.
For over six persons.....		6,500 sq. ft.

(The space provisions for street access will be assessed in a later section, along with those required by other factors still to be reviewed.)

Technology

Technology provides better and an increasing variety of material and methods to help achieve the optimum physical environment. Through technology, natural features and requirements are enhanced, changed, even completely displaced, like substituting the ultra-violet lamp for daylight as a disinfecting factor.

The following is a list of the more common technological improvements evident today. For convenience, they are listed under four headings, household equipment, building materials and methods and architectural detailing and "others". Each item listed is followed by a comment of its effect on the physical design of the "unit". It is noted that there are many new advancements whose impacts are yet to be assessed. Some of the more obvious are discussed in the latter part of this thesis.

Household Equipment

1. Better heating and cooking facilities:
Less fire hazards,
Elimination of need for basement "furnace rooms",
New fuels eliminate large storage facilities,
The kitchen can be more compact.
2. Forced ventilation and air-conditioning:
Less dependency on windows and other openings for air,
Less space needed for required volume of air or "air change effect".
3. Refrigeration:
Elimination of cold storage cellars,
Less kitchen space needed for cooking and storage through use of compact "prepared" food stuffs.
4. Better artificial illumination:
Less dependency on natural light.
5. Ultra-violet lamps:
Less need for daylight as a factor for disinfecting of

rooms, etc.

6. Laundry equipment, automatic dryers:
Less space needed for this facility,
Less or no space required for outdoor drying.
7. Garbage disposal and incinerators:
Less garbage and trash removal service,
Less need for provision of facilities for storage.

Building Materials and Methods

1. Reinforced concrete:
Permits slab on ground construction, facilitating the spreading out of the dwelling.
Concrete as a fire resistant material displaces space as a fire protection measure.
2. Insulation:
Permits closer juxtapositioning of units since there would be no need for space as an insulation factor for noise and heat.
3. Fire resistant building materials:
Permits closer relationship of units.
4. Roofing material:
The use of flat roofs cuts down the height and the bulk of the building.
5. Post and lintel construction with fill-in walls:
Permits flexible construction, allowing the adding or subtracting of floor area.

Architectural Detailing

1. Use of large areas of glass for visual integration of outdoor and indoor living space requires better use of site conditions, i.e., more freedom in placing the dwelling unit in relation to lot, etc.
2. Clerestorey, strip windows, louvres for light and ventilation:
Permits closer building relationship for light and privacy.
3. Skylight and forced vents:
Permits planning and use of interior rooms.
4. Built-in features:
Cuts down on storage space and other space requirements in general.
5. Coupled with the development of many wall and other building materials, in general architectural detailing of walls, partitions, stairs, etc., have tended to cut down actual construction volume.

Others

1. The automobile:
Need for immediate access, shelter for vehicle as close to the dwelling unit as possible requires close relationship of dwelling unit to street.
2. Radiant heating:
Used integrally with paving construction eliminates the hazard and inconvenience of ice and snow, permitting use of steeper grades and requires less space for snow piling or removal.

We might summarize the effects of technology as being two. First, the space standards for the dwelling may be modified by the many facilities which help to cut down or substitute certain space requirements. Second, the cumulative effect of technology is greater flexibility of construction which permits a greater variety in the final

form of the building. This means that the site or lot should be of such size and shape to accommodate the maximum variety of plan forms. This suggests the need for greater flexibility of controls so that the "tailoring" of the site conditions to the dwelling unit or vice versa can be accomplished.

Way of Life

In many cases the trend towards ever-increasing community activities indicates less use of the "home" as a place to "live". It is just a place to "bunk" for many. On the other hand, other factors point just as significantly to the contrary and the tendency is to fulfil the English adage, "that home is the man's castle", providing the setting for all but a few of man's activities. But, between these two tendencies, certain phenomena can be observed which have a decided and measurable effect on the physical design of the dwelling unit and its environs. In general, these factors express the need for greater efficiency in the design of the dwelling and its site. The following are the most conspicuous of trends and their influence on the physical design.

Social Reform – Very few are now in a position to afford full-time household help. Only the select few have governesses to look after their children. Many of the household duties have been "commercialized" and are completely eliminated in other instances. The effects on the physical design of the unit are as follows:

1. More compact plans (multiple use of space).
2. All ground level construction to facilitate household duties and supervision of pre-school children.
3. Increasing use of mechanical equipment which has the effects listed under the section discussing technology. In general, space saving devices and easy maintenance equipment is used.
4. Greater use of prepared food and other commercialized services, again eliminating need for large storage space and space for work.

Since the "elevation" of service to a higher social status, if you will, the trend has been to eliminate the back door and use the front for this facility. Hence, the need for easier access to the dwelling unit from the street front for deliveries and service calls requires some new thought on the design of the dwelling unit, and as a corollary of the street.

Customs and Fashions – The trend has been towards "informal" living habits. The "techniques" of entertaining, resulting from the decreasing use of help, has eliminated "parlour" rooms, the large hall space. The general tendency has been towards the multiple use and integration of various rooms. The most common being the combining of the living and dining rooms. The popularity of outdoor living and the trend towards the integration of outdoor and indoor living space, visually and physically, has the following effects:

1. Ground level construction.
2. Use of large areas of glass making orientation to sun an important feature.
3. Wind direction and views become very important considerations.

4. The preservation and exploitation of minute natural features.

Again, the demand here is greater freedom to choose and develop the site and dwelling unit as one wishes. The major concern here is how the other elements, such as lot space requirements and right-of-way provisions, are regulated.

Site Conditions

"No two building lots are orientated identically with respect to any other lot or to all lots, nor with respect to the wind and sun",¹ states Ratcliff in discussing urban land economics. In many respects, this uniqueness of land is more important in the considerations of the residential lot than in the highly commercialized urban lot of the financial or retail trade areas. To a much greater degree than in commercial buildings, the added value of the residential building is dependent on the many seemingly intangible relationships of the dwelling unit to its site. The orientation to wind and sun, the relationship of trees and other vegetation, the view and many other "natural" features of the site need individual attention if the best "use" is to be made of the lot. Hence, any controls must recognize the fact that no two lots are the same. This demands a maximum of flexibility in the controls.

Personal Desires

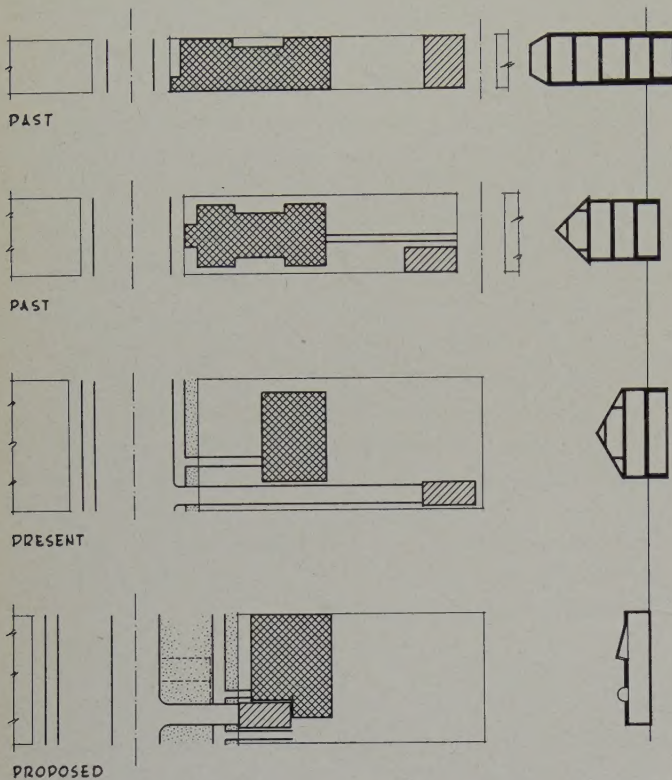
Admittedly, there is available the variety of lots and the freedom to develop these lots but only for the select few and at a certain sacrifice of social integration. It should be possible, within greater limits, to make available this variety and freedom to develop one's lot as one wishes for practically all "grades" of home-owners. Then, with respect to this development of the site, the contradictory and unpredictability of individual preferences is illustrated by the use of plate glass. It was not long ago that the intent of the "picture window" was for the visual appreciation of the outside from within, along with the desire for more sunlight in the room. Today, this picture window may appear on the north facade of the dwelling and the view is towards the inside from the outside. This also illustrates the sophistry in the employment of privacy. Suffice to say, the controls must respect individual prerogatives as much as possible. Actually, this has so many intangible relationships with any physical design concepts that we cannot specifically make provisions for it. Again, the need is flexibility of controls to take care of any reasonable demands of the individual.

Summary of Influences and Trends

In the following, the influence of the various factors discussed are listed in a chart form under several headings which are self-explanatory. By no means comprehensive, it nevertheless serves to indicate the variety of influences that need to be considered. While some factors demand more space, others tend to require less space and even displace space. Plate I graphically illustrates the general trend in the development of the dwelling unit, its yards and street access.

¹ Ratcliff, R. U., "Urban Land Economics" (New York, McGraw Hill, 1949) p. 3.

GENERAL TREND OF DEVELOPMENT OF TYPICAL DWELLING UNIT, LOT AND STREET ACCESS



Summary of Trends of Development of the Unit from the Foregoing Analysis

(See Plate I)

1. The dwelling unit covers a larger ground area but with less bulk, i.e., cubage contents.
2. The front street now serves for both "formal" and service calls. Further, the increasing use of the automobile requires more service, i.e., snow removal, maintenance, etc., besides parking facilities close to the dwelling unit.
3. The "new" uses of the site require greater flexibility in the placing of lot lines, relationship of site to access street.
4. Many technological improvements and developments in household equipment, building materials, methods of construction, architectural detailing substitute and, in some cases, completely displace space requirements.

FACTORS RELATED TO DWELLING UNIT THAT:

Decrease Total Floor Area

1. Integration of various rooms.
2. Elimination of large halls, stairways, etc., more compact planning.
3. New household equipment, e.g., refrigerators, gas and electric range, washing machines, etc.
4. Built-in fixtures and storage facilities.
5. Use of multi-purpose and "put-away" furnitures.

Decrease Building Volume

1. Flat roof construction.
2. Forced type heating systems, refrigeration, eliminating basement furnace rooms, fuel storage bins and cold storage cellars.
3. Air-conditioning and forced air equipment requires less room volumes for air-change.
4. New building materials cut down construction volume, i.e., space taken up by structural and other materials.

Increase Building Coverage

1. All ground floor construction for reasons of: safety, convenience, easy maintenance, etc.
2. Trends towards integration of outdoor and indoor areas.
3. Reinforced concrete facilitating ground level construction.
4. Forced heating systems permit spreading out of construction.
5. Garage, carport, breezeway and other facilities.

FACTORS RELATED TO SITE THAT:

Eliminate or Displace Protective Space Requirements

1. Fire-resistant building materials and automatic fire fighting apparatus require less or no "side yard" requirements.
2. Artificial illumination eliminates need of daylight for lighting purposes.
3. Ultra-violet ray lamps eliminate necessity of day light as a disinfecting factor.
4. Clerestoreys, louvres, skylights, forced vents require less or no exposed wall space for light or air.
5. Better noise insulation permit abutting of buildings.

Affect Site Requirements in Other Ways

1. Automatic dryers, garbage disposal units, incinerators require less outdoor space for clothes drying, garbage cans, trash storage.
2. Trend towards elimination of rear alleys requires both service and formal entrance facilities on front of house (or vice versa) demands greater width of lot.
3. Trend towards placing of living areas towards rear of lots require proper orientation.
4. Increasing dependency on automobiles require new relationship of street access to dwelling unit.

FACTORS RELATED TO STREET DESIGN THAT REQUIRE NEW APPROACH

1. Increasing use of motor vehicles require:
free and clear roadways,
parking facilities.
2. Utilities.
3. Street landscaping.

SOME SUGGESTED PROVISIONS

Recapitulating, the community's interest can be broadly stated in two categories.

1. The physical provision of adequate space for building and access.
2. The provision of maximum freedom in the choice and development of the lot, dwelling and access street.

The problem is also twofold. The first is, how many types of specifications and the second is, in what terms. The minima resort to spatial dimensions is desirable but unfortunately, there seems to be no substitute for space standards that will convey the desired "qualitative" provisions while assuring provisions of adequate absolute space. In view of the above, the following attempts to evolve a method of specification that will assure the provision of adequate space and the other material requirements, while maintaining that freedom so essential for the designer and the individual.

Provision for Space

In a previous section (Social Policy) using the APHA space standards for the dwelling units, basic space standards for the lot were developed. The table is reproduced below.

For 1 person	(400 plus 550)	3=2,850 sq. ft.
For 2 persons	(750 plus 550)	3=3,900 sq. ft.
For 3 persons	(1,000 plus 550)	3=4,650 sq. ft.
For 4 persons	(1,150 plus 550)	3=5,100 sq. ft.
For 5 persons	(1,400 plus 550)	3=5,850 sq. ft.
For 6 persons	(1,550 plus 550)	3=6,300 sq. ft.
For over 6 persons.....		6,500 sq. ft.

Obviously, this variety of space standards cannot be used in any one subdivision without actual knowledge of the future occupants' requirements. And since this is improbable in most cases, the most "flexible" median must be found. An insistence on the maximum as a minimum will be wasteful but provisions for this maximum must also be made. Many families desire more space than others in the way of dwelling space, while others desire less space for outdoor activities. This thesis suggests 4,500 square feet as an absolute minimum. (This again is a value judgment based on the author's limited experience, and is used here for a specific reason which will be apparent in the later section showing a comparison of the proposed provisions with present regulations.)

This minimum must then be modified by several considerations relative to the locality and the larger residential areas. They are as follows:

1. A more detailed population analysis as regards to median family size, ratio of cars to people (see footnote on page 349), etc., for the locality, may suggest a larger minimum.
2. The type of utilities available or intended, such as whether they are piped water and sewerage system or independent well water supply and septic tank system, will dictate another minimum subject to soil, drainage and other factors.
3. The topographical and climatological conditions will have their influence on the minimum size of lots. Soil

and drainage conditions have been mentioned. Contours, vegetation and other features, will affect the amount of buildable area available.

4. The relationship to the rest of the area, as to the proposed plan of development, particularly any density policy, will have its effects on the minimum for any given area.

The last brings us to the next desired provision, that of the availability of a variety of lot sizes and types or shapes in any one area. This means that the density established by the minimum must be modified to allow for the variety since any variation from the minimum will require additional area. The suggestion is that the overall density requirement be expressed in terms of dwelling units per gross acre¹, in relation to the minimum lot area specification. For example, "6 dwelling units per acre, minimum lot area 4,500 square feet". Such a combination will permit a variety of lot sizes in an area, with the smallest being the minimum. (See Plate V) The added provision of the minimum number of lots per unit area, may be desired. For example, 12 lots per every two acres for the 6 dwelling units per acre will assure, more or less an equitable distribution. In other words, this will prevent the crowding of all the minimum size lots in one section, and the larger in another, in a large 50 acre development. In the case mentioned, we are assured of 12 lots of various sizes distributed in every two acres. (See Plate V)

A fifth basis may be added to the group of four listed as considerations at the beginning of the section, as an essential consideration for density provisions. This is the consideration of other services as distinct from utilities such as schools, transportation, parks and playgrounds and other communal facilities, etc.

The suggested definition of the dwelling unit is a "residential building on a surveyed lot registered for this purpose." This does not limit the number of families or groups of persons living in a dwelling unit. If limitations of density in the real sense, i.e., the number of persons per unit area is desirable, a floor area per person as recommended by APHA can be incorporated, coupled with the desired Floor Area Ratio which will be discussed in the following sections.

Other Provisions for the Lot

A minimum width for the lot may be incorporated as a measure of expedience. The recommended minimum is 40 feet clear for building purposes. Any other space requirements such as access to rear of lot should be added to this. The 40 foot suggestion is another tentative value judgment based on the perusal of the better dwelling plans published in various architectural magazines. For reasons illustrated in Plate XI, the minimum lot width should not be a frontage requirement. Rather it could be the width required at a point one third of the distance from the street or frontage.

¹ Gross acre as used here includes streets, alleys, easements, and other access ways, but not parks, playground or totlots, etc.

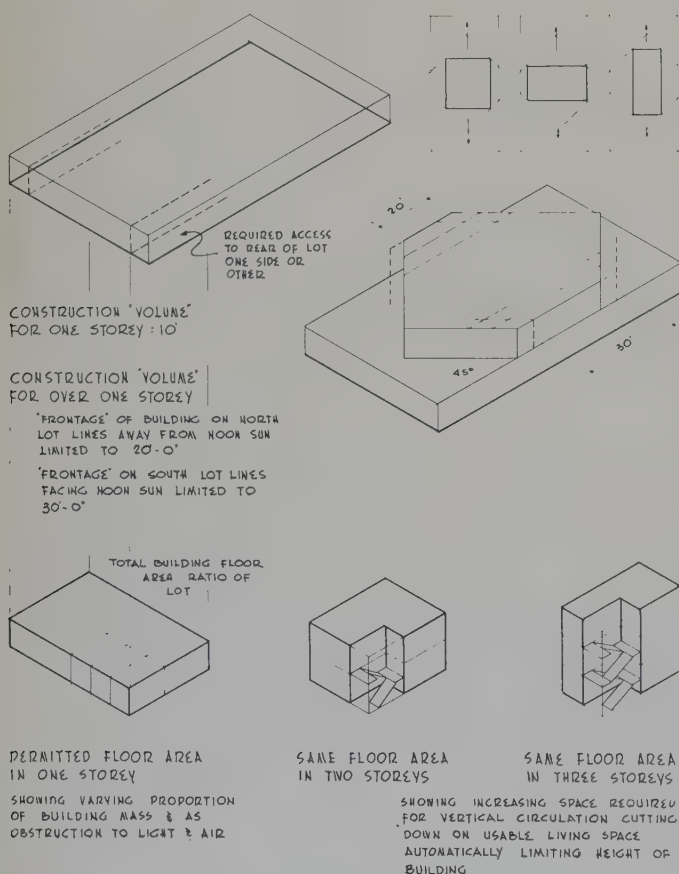
The three-dimensional aspect of the lot must now be considered. The provision of light and air and other elements dependent upon the vertical projection of area will require maximum flexibility in the control measures, if imaginary lines of restrictions are not to become real obstacles.

The Floor Area Ratio (FAR): the total floor area of all storeys used for residential purposes (including garage, sheltered car-port, garden houses, enclosed porches, tool sheds, etc.) divided by the area of the residential land, to control density with an additional index of floor area per person is recommended by both the American Public Health Association and the Harrison, Ballard and Allen report for the rezoning of New York¹. As a result of this type of control of building bulk, it is illustrated that both light and air are automatically provided for without any further rear, front or side yard requirements.

But, we have seen that with the use of technological facilities, natural space requirements can be decreased or in cases completely displaced. Therefore, the FAR is suggested here as a measure to control only the relationship of building to open area or to put it in design terms, mass to space. Further, no restrictions as to placing this mass are suggested, except for the minimum frontage of building over one storey or 10 feet on any rear or side lot as illustrated in Plate II for the following reasons.

PLATE II

BUILDABLE AREA ON LOT - MINIMUM BUILDING FRONTAGE FOR SIDE & REAR LOT LINES - FLOOR AREA RATIO (FAR)



1. The possibility of any residential building over 3 storeys is remote because:
 - a. With FAR restriction on the typical A residential area, the amount of usable floor area per storey decreases too rapidly with every additional one. (See Plate II) The amount of space taken up by vertical circulation will actually eliminate all floor space when carried to its maximum.
2. With FAR, if the owner still wishes to build up, the proportions of the "tower" residence is such that it is no more a major obstruction to light and air than the average-sized tree.
3. The fact that his neighbor can also build as he desires will persuade the home owner to place his own dwelling so as to protect his own access to light and air, should he have window adjacent to his neighbor.

The suggested provision of the limitation on the building frontage on the rear and side lot lines need not be included, but this may be desirable where the FAR specification is large. In this case, this "frontage" could be a percentage of the lot width, but 30 feet is recommended for frontage on the south side and 20 feet on the north. (See Plate II)

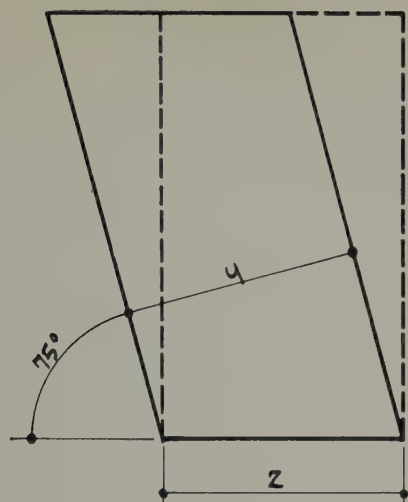
The FAR is directly related to lot area and density, the index becoming smaller as the density decreases. Consideration may be given to the open space of the street in any calculation. For the example illustrating this provision in the comparative analysis, the FAR index suggested is .4, which is comparable to the building area permitted in present regulations for a 6,000 square foot lot.

Since the practice has been to eliminate the rear alley, an essential provision for reasons of safety is an access to all parts of the lot without the necessity of going through the building. If an alley or an unobstructed easement is provided from the ends of the block, building in a solid row is permitted. The width of this clear access should be determined by local considerations and recommendations of the fire department, ambulance corps, police, etc., but an 8 foot clear passage will permit adequate access for the stretcher bearers, pulmotors, an iron lung, etc. This provision is over and above the minimum building lot width.

As a measure to facilitate the provision of the variety of lot sizes and shapes, instead of the usual 90 degree requirement, a minimum re-entrant angle of 75 degrees between lot lines is suggested. This will also facilitate orientation of the lot to the elements and to take advantage of any topographical nature of the area when other limitations are imposed. For example, where the grade of a street on a sloping site cannot be changed and the utility lines placed in the street, conditions arise where the lots on one side of the street cannot be served adequately by the utility line because of the difference in elevation. The deviation of the lot line from the normal helps to avoid this difficulty as illustrated in Plate VII.

The actual loss in buildable lot width is clearly shown in Plate III.

¹ APHA Standards for Healthful Living, "Planning the Neighborhood" (Public Administration Service, Chicago, Illinois, 1948) p. 40. And Harrison, Ballard and Allen, "Plan for Rezoning the City of New York" (City Planning Commission, New York, 1950) p. 45.



$$\text{WIDTH } Y = \sin 75^\circ \times Z \\ = 0.96593 \times Z$$

$$\text{LOSS IN WIDTH} = \text{VERSED SINE } 15^\circ \times Z \\ = 0.03407 \times Z$$

EXAMPLE: 60' FRONTAGE LOT

$$\text{WIDTH } Y = 0.96593 \times 60 = 57.96' \\ \text{LOSS IN W} = 0.03407 \times 60 = 2.04'$$

Provisions for the Access Street

The remaining consideration is the access street. The basic function of the street as a means for access for pedestrians and vehicles and a place for laying of utility lines has not been changed, but with the advent of the automobile, the spatial requirements have been greatly modified. The trend has been to use the front street for service since the trend towards elimination of the rear alley. The suggested type of provision is to stipulate the desired functions based on the desired features. The provisions would be as follows:

1. The number of moving lanes desired based on probable number and type and desired speed of vehicles using the street. The thesis suggested a minimum of two moving lanes of 9 ft. width, which is recommended for the desired maximum of 20 m.p.h. in residential areas. Where a short loop street is used, probably one lane with a solid shoulder in one direction will suffice.
2. Parking requirements will cause the greatest variation in the design of the right-of-way. The usual 30 foot pavement requirement provided street parking supplied by the community. The proposal is that the community assume responsibility for one space per dwelling unit and any additional requirement be the responsibility of the home owner. Further, it is suggested that while the community assumes full responsibility for repairs and service of the moving lanes, the responsibility of repairs and service of the parking bays be divided. The home owners should assume the responsibility of keeping the parking space clean and free of

snow. Only off-street parking will permit this type of arrangement, but since there are no restrictions as to the exact width of the right-of-way, various designs are possible, permitting the placing of the parking facilities appropriately near the street, yet convenient to the dwelling. A few possibilities are shown in Plate VIII, IX and X.

3. The common practice has been to place sewerage and water mains under the hard surfaced roadway, as a result of inadequate right-of-way width. This has made subsequent maintenance and repair expensive and a hazard to traffic. The right-of-way should provide a separate strip, coupled with another function such as space for snow piling, etc., for this need. It is suggested that the community assume the cost of supplying utility lines, water and sewerage up to within 5 feet of the dwelling, or to the point where most building codes require the change of tile to cast iron pipes in the case of the sewerage line. This is recommended as an incentive for builders and home owners to place their dwelling units with more concern for design. Though it may seem a trivial item, the fact that, in many cases, the monotonous alignment of buildings on too many streets is due to the reluctance of the builders to assume the small additional cost of supplying the extra lengths of utility lines if the building is set back beyond that required. As a matter of fact, they are justified, since in most cases the set-back is excessive. With the proposed provisions, the small extra cost to the community would be offset by the savings made in paving width, easier maintenance and access of lines. In any case, the added value, aesthetic if you will, should justify the community absorbing the relatively small cost.
4. Provision for snow removal or piling. The space requirements for this provision will depend upon the local snow fall data, method and type of snow removal equipment, etc. Where radiant heating coils are used, this provision will not be necessary.
5. Provision for pedestrian sidewalks. The number and type will depend on the general density of the area. For the typical area of 5 or more lots per acre, possibly two will be desirable, but the designer should be free to place these anywhere on the right-of-way to suit his design, as long as there is no danger to the pedestrian from traffic and the sidewalks are convenient as accesses to the street and dwelling. A minimum buffer strip, say, 5 feet, between the sidewalk and the right-of-way line (now the building line also) may be incorporated for building convenience, i.e., placing of footings, sewerage connections, etc.
6. Provisions for planting, street illumination, etc. This provision will depend upon the overall policy of the community to perform the functions of "civic" gardener. The street light system should be planned with the tree planting, since it is obvious that improper placing of lights or careless planting of trees will negate the value of street illumination. Much, of course, will depend upon existent vegetation and soil condition. The width of the planting strip should be geared to the type of trees intended or permitted to be planted.

Summary of Provisions and Comparable Existing Regulations

The foregoing provisions are summarized under two categories, the lot and street access, but are numbered consecutively for convenience, and to suggest that these should be treated in entirety and not separately, as is the case with present day zoning and subdivision regulations. The present regulations that these would displace are noted immediately after each provision.

For the Lot

Provision 1:

- a. Overall density in terms of dwelling units per gross acre,
 - b. Minimum lot area,
 - c. Minimum buildable lot width,
 - d. Number of lots per unit area,
- instead of the single minimum size lot, frontage and proportion of lot.

Provision 2:

- a. Floor Area Ratio (FAR),
 - b. Minimum "frontage" of building over one storey of 10 feet on any side or rear lot lines, the allowable depending upon orientation,
- instead of the side, rear and front yard set-back requirements.

Provision 3:

- a. Minimum re-entrant angle of 75 degrees for lot lines,
- instead of the 90 degrees required in present regulations.

Provision 4:

- a. A free and clear access to all parts of the lot other than through the building. Width determined by local requirements and is over and above the minimum lot width of provision 1c.

There is no counterpart in the present regulations to this provision, unless the side yard requirement is construed as accomplishing this purpose.

For the Street Access

Provision 5:

- a. Number of moving lanes,
 - b. Number and type of parking space facilities,
 - c. Number, width and type of pedestrian walkways,
 - d. Buffer strip requirement between sidewalk and building line,
 - e. Space for snow piling,
 - f. Specifications for placing of utility lines,
- instead of the regulation specifying the exact widths of roadway and right of way.

Several basic differences are noted. First, of course, is that the proposed type of provisions is more detailed. This is in accordance with the principle of the performance

type standards where a specification is limited to its own particular concern. Provision 5 is the best illustration. Second, no minimum lot frontage on the street is required. A nominal width of 20 feet may be specified which will assure access by truck or car, but it is felt that there is no need for this, since the value of the lot from any point of view, depends upon the provision of so obvious an element. (The resultant flexibility of this provision is illustrated in Plate XI). Then, the building line and the street right-of-way now coincide. This coincidence is deliberate for several reasons. (Many of the advantages are illustrated in Plates VIII, IX and X).

1. With the excessive set-back requirements and conditions of the present regulations, the owner of the lot need not own his front yard, since the community, in effect, takes over the use for all practical purposes, and yet does not use it. The illustration shows how advantageously this area can be used. (See also No. 4 below in this connection.)
2. With the proposed provision, or even with present regulations, building up to the property line does not "crowd" the street, and space between opposing lines of buildings is more than adequate for light and air.
3. The excessive set-back as a means to establish, or help establish the desired "character" of the residential area is not as valid as it seems. There are other elements more effective and of real significance that "stamp" the character and assure the integrity of the residential district. These are the proper relationship of mass to open space, of trees, of other forms of vegetation, the street design making utmost use of topographical features; in short, the design aspect which may, or may not, depend on a front yard set-back.
4. From the illustrations, it is fairly obvious that the provision of off-street parking between the sidewalk and roadway is not only aesthetically satisfying but is more functional than providing it on the lot. It is further suggested that placing the sidewalk in this position is much more residential in character, resulting from the proper segregation of the automobile towards the roadway and the intimacy gained from being able to walk close to the homes, away from traffic. Also clearing the street and providing off-street parking in this manner, greatly facilitates street cleaning and snow removal.
5. While it is a basic premise of good planning to provide flexibility, the main idea of planning is to secure that stability which arises from permanence of use. Any one street may have an excessive set-back imposed for reasons of probability of future requirements, but surely not all the residential streets need be designed for the same reason. Only when that permanence is established through good design can the stability of "character" of the value of the residential area remain for both real estate and taxation purposes.

GRAPHIC COMPARISON OF THE PRESENT WITH THE PROPOSED TYPE OF PROVISIONS

A graphic comparison of the design possibilities of the present and the proposed type of provisions follows to clarify further the foregoing analysis and the subsequent provisions. The comparison takes the form of listing the common disadvantages of the present regulations, and shows how the proposed type provides the necessary flexibility to overcome these difficulties. For ease of presentation and clarity, each provision is illustrated and compared separately or grouped together where the specific advantages accrue from a combination of provisions.

To make the comparison, a typical "A" residential district is chosen, requiring 6,000 square feet for the lot area, a frontage of 50 feet, a street width of 50 feet with a roadway requirement of 30 feet. The zoning regulations¹ further stipulate side, back and front yard set-backs, height and other restrictions. The comparable set of provisions of the proposed type is evolved as shown in the following discussion and illustration.

The density of the assumed type of area is approximately 6 per gross acre (including street space. See Plates IV and V). The minimum lot size proposed under the proposed provisions is 4,500 square feet, with a minimum lot width of 40 feet plus the free and clear access space of 5 feet. As the illustration will show, this is about twice the building area, though the entire lot area is not to be used for building. The other corresponding provisions are quite clearly shown below and Plate IV graphically illustrates the results of the present and proposed type of regulations.

Comparative Specifications of Present and Proposed Type for Zoning and Subdivision Controls

Present

Density	6 lots per gross acre.
Minimum lot size	6,000 square feet.
Minimum frontage	50 feet.
Height restriction	35 feet.
Building coverage	33% for main building, 8% for accessory buildings.

Total 41% or 2,460 square feet.

Front yard set-back.....	25 feet.
Rear yard set-back.....	25% of lot depth or 25 feet.
Side yard	3 feet minimum or aggregate of 12 feet.

Buildable area on 50 by 120 ft. lot is area 38 by 70 ft.
2,660 square feet.

Lot lines to be at 90 degrees to street line.

Street width	50 feet.
Paving width	30 feet.
Sidewalks	2 at 5 feet.
Utilities buried in centre of street.	

Proposed

Density	6 lots per gross acre.
Minimum lot size.....	4,500 square feet.
Number of lots required	12 per 2 gross acres.
Minimum re-entrant angle for lot lines	75 degrees.
Floor area ratio of .45 which means an area of 2,025 sq. ft.	
Access, free and clear to rear of lot...5 feet width.	

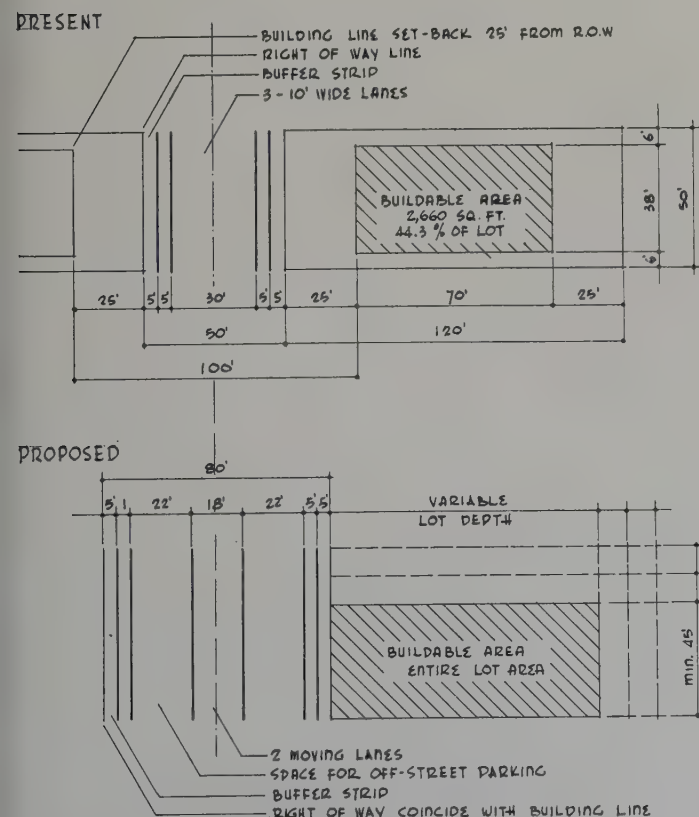
Street Provisions:

1. 2 moving lanes of 9 ft. width each.
2. 2 sidewalks of 5 ft. widths.
3. One off-street parking per dwelling unit.
4. Strip for snow piling 16 cubic feet per lin. ft. of street.
5. Utilities to be placed as desired.

¹ The actual set of regulations used is that put forth by the National Research Council of Canada in their "Model Zoning Bylaw", Ottawa, 1939.

PLATE IV

COMPARISON OF PLAN RESULTS OF PRESENT AND PROPOSED TYPE OF PROVISIONS



Drawbacks of Present Regulations and Comparative Advantages of Proposed Provision 1.

Present

1. Even though the general character of the land may be the same, the rigid lot size specification will not permit parcelling of land to exploit minute natural features of the land such as trees, rock outcroppings, and other small-scale promontories, valleys, etc.
2. Monotonous alignment of building is further accentuated by the fact that the alternate open space and building mass tend to be the same. The width remaining for building purposes after space is taken for side yard requirements from the average size lot, is cramped. Therefore, full use must be made which results in the repetition of the same size space between all buildings on the same size lots. See page 355.
3. The needed variety of choice of type, size and form of lots in the same area is not available.

Proposed

1. The flexibility through availability of various lot sizes permits greater facility in exploiting minute natural features of the site. The lot can be "tailored" to site conditions.
2. With a variety of lot sizes, even though the same mass or width of building is used, variations are possible, since the remaining open spaces will differ. If the open

space is kept constant, the mass must vary.

Further, the incentive provided in the proposed provision V, where the community assumes the cost of supplying utilities up to 5 feet of the building, conformity to the building line for economic reasons is not necessary. See page 355.

3. The desired variety of lot sizes, types and forms is made available on a relatively small scale.

Drawbacks of Present Regulations and Comparative Advantages of Proposed Provisions I and II.

Present

1. With excessive set-backs, provision of garage or sheltered carport consumes much area, discouraging or prohibiting any advantageous use of lot for other purposes.
2. Side yard requirements force the dwelling unit into a narrow building area, resulting in cramped designs, necessitating recourse to many alternatives, such as narrower hallways and doorways, shallower closets, shorter kitchen counters and the like, to retain a workable plan.
3. Many small pockets of lot space, difficult to utilize, cutting down excessively on the available space of the narrow lot result from side yard regulations.
4. Integration of outdoor and indoor living space is made difficult, since consolidation of space is impossible.

PLATE V

COMPARISON OF DESIGN POSSIBILITIES UNDER PRESENT REGULATIONS AND PROPOSED PROVISION 1.

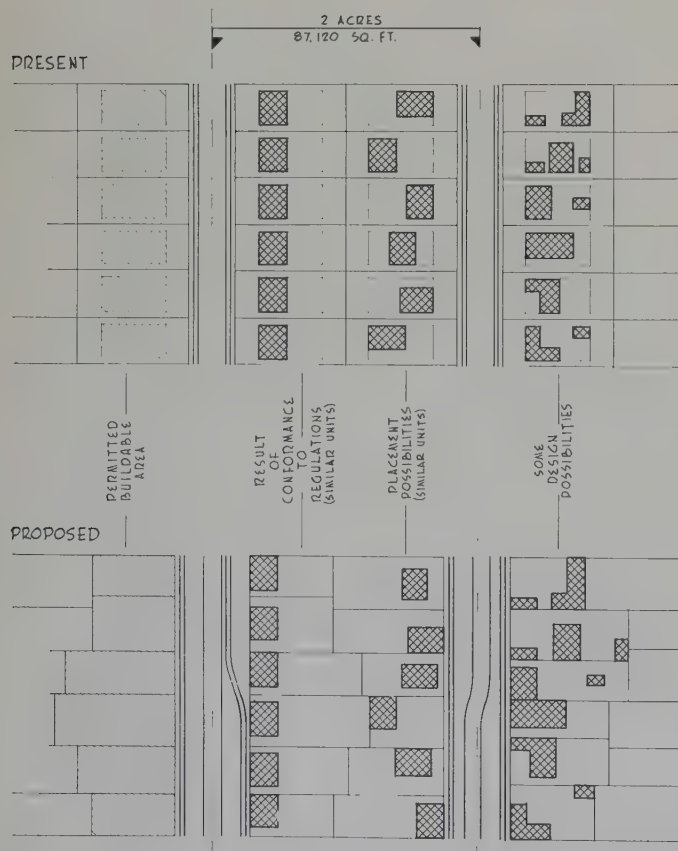


PLATE VI

COMPARISON OF DESIGN POSSIBILITIES UNDER PRESENT REGULATIONS AND PROPOSED PROVISIONS I & II



Proposed

- 1. Provision of garage or carport, convenient to both street and dwelling, is possible with very little encroachment on valuable lot space.
- 2. Provides more building space, permitting "uncramped" planning of dwelling, facilitating evolving the "informal" plan so desired for the "new type" of living.
- 3. All open spaces may be consolidated in any one area for the desired use.
- 4. Greater opportunity is provided for the exploitation of the natural assets of the site permitting the best outdoor-indoor relationship desired.

Drawbacks of Present Regulations and Comparative Advantages of Proposed Provisions III and V.

Present

- 1. To serve lot with sewerage system on the low side of the street, excessive depth of main is required at the street centre.
- 2. Utility lines must be buried under hard pavement.
- 3. Depending upon slope of ground and soil condition, ground drainage runs into adjacent lot or may not be easily trapped and drained, since difference in elevation of trap to storm sewer may be too excessive.
- 4. Orientation to sun, wind and view, may be hampered through the necessity of lot lines conforming to the 90

degree requirement. The street line may have to be in that position for other unavoidable reasons.

Proposed

- 1. Where lot frontage is narrow, angling of lot lines coupled with the greater latitude in placing utility lines in the right-of-way as provided, permits taking advantage of slope of land requiring less depth for the main.
- 2. Utility lines may be placed under "softer" surfacing, making access for repairs and maintenance less expensive and hazardous to traffic conditions.
- 3. With judicious placing of lot lines, ground drainage can be confined or controlled and drained in its own lot space.
- 4. Angling of lot lines permits some flexibility for orientation purposes.

Drawbacks of Present Regulations and Comparative Advantages of Proposed Provision V.

Present

- 1. More paved surface is installed than is actually necessary.
- 2. Not enough space is available for snow piling.
- 3. With street parking, snow removal and street cleaning are made very difficult, if not impossible.
- 4. Besides interference with traffic, provision of street

PLATE VII

COMPARISON OF DESIGN POSSIBILITIES UNDER PRESENT REGULATIONS AND PROPOSED PROVISION III & V

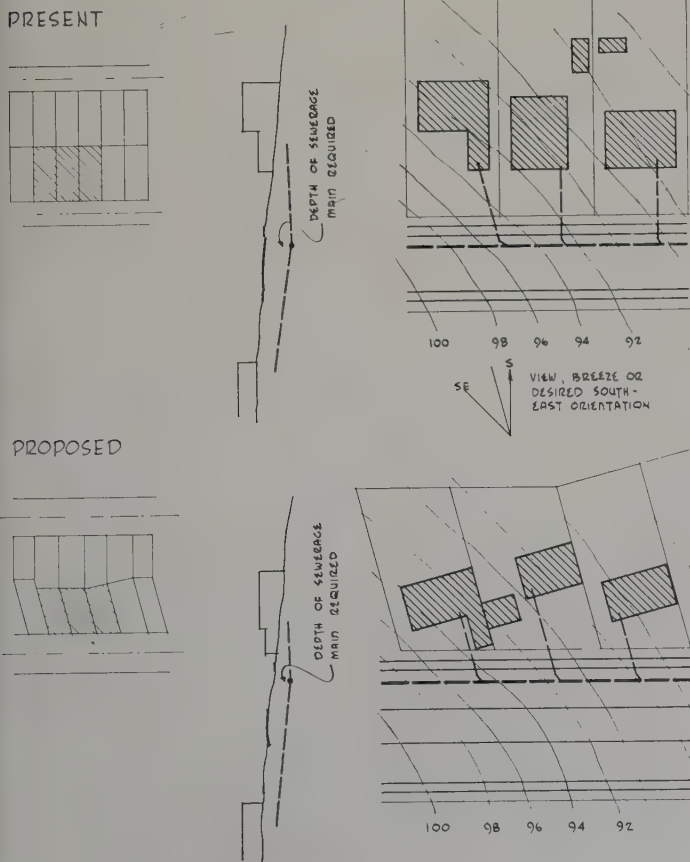
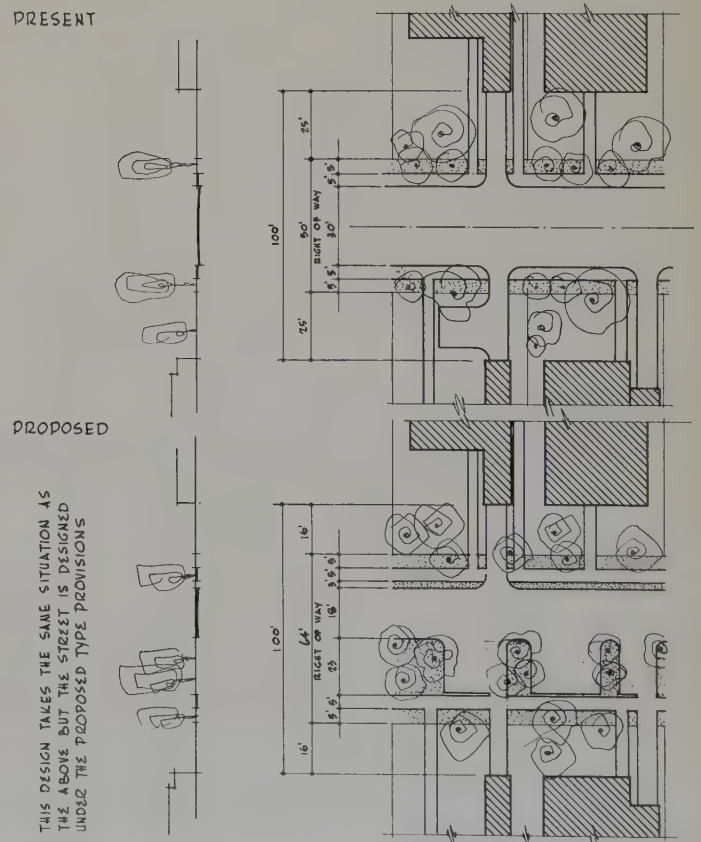


PLATE VIII

COMPARISON OF DESIGN POSSIBILITIES UNDER PRESENT REGULATIONS AND PROPOSED PROVISION V.



parking is very expensive.

5. Tree planting is almost impossible, since adequate ground space is not available on the right-of-way.
6. Generally, the present street is aesthetically unsatisfying as a result of the above.

Proposed

1. No more paving than necessary need be provided.
2. Sufficient space for snow piling is provided.
3. With no street parking, snow plowing and street cleaning are greatly facilitated.
4. Adequate space for off-street parking is provided on the right-of-way, convenient to both road and dwelling, without interfering with either pedestrian or traffic. Gravel parking bays can be provided much cheaper.
5. The greater latitude permitted in placing the paved roadway allows mass tree planting, helping to create a park-like atmosphere.
6. Variation in roadway alignment is possible to lend variety and to control speed of traffic.
7. Additional parking space may be had at a very small cost, by providing individually, or communally, gravelled parking courts on the right-of-way. These can be very easily landscaped and maintained.

Note: The distance between buildings on the opposing side of the streets is less than that required under present regulations.

PLATE X

OTHER DESIGN POSSIBILITIES

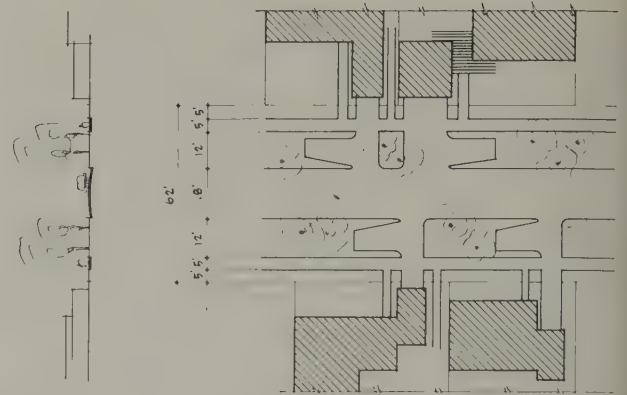


PLATE XI

NEW SUBDIVISION POSSIBILITIES

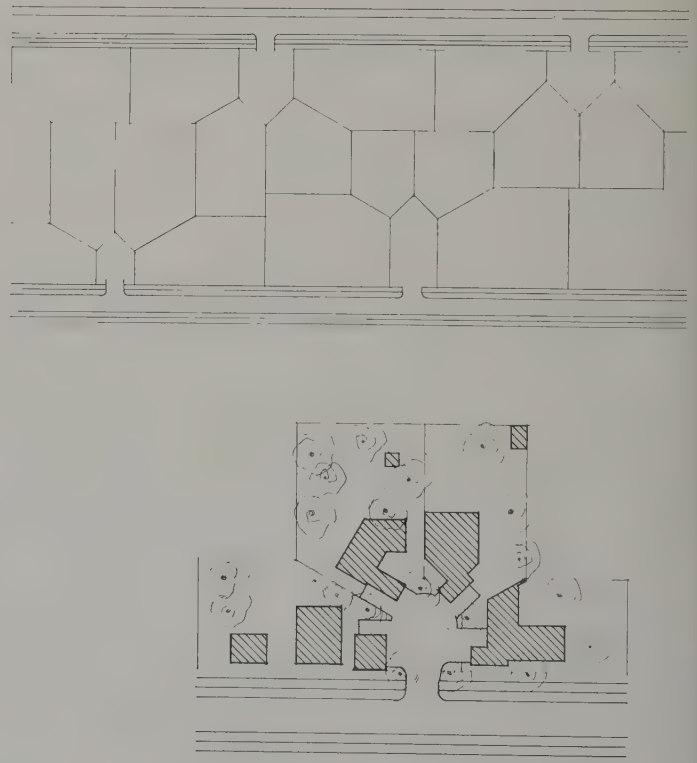
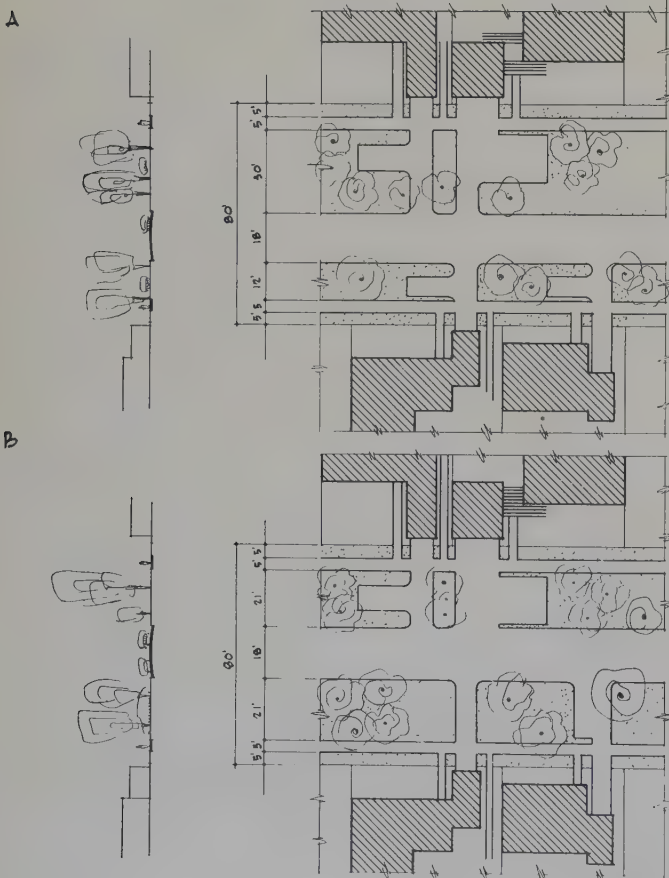


Plate XI illustrates a possibility in subdivision design using land more efficiently. This type of development is not possible under present regulations where minimum lot frontages are imposed rigorously. This particular design recognizes the need for providing access to fit the needs of the dwelling rather than fitting the dwelling to the access street. The street is minimum and is strictly for

PLATE IX

OTHER STREET DESIGN POSSIBILITIES WITH PROPOSED TYPE PROVISIONS



movement of traffic. Parking facilities are provided in the common motor court which gives direct access to the four lots served. This court may also be minimum, i.e., restricted as a large "driveway" or may be larger to provide for additional parking. In this connection, periodic excessive parking requirements can be taken care of by use of the buffer strip on the street right-of-way, which will be a minimum of 10 feet in width. A portion of this strip near the approach to the court may be gravelled for this purpose. Each owner can still provide additional parking facilities on his own lot, if he pleases.

The community could assume the responsibility of maintenance and repair of the court, while the servicing, i.e., cleaning and snow removal, be the responsibility of the owners. An arrangement might be made with the community whereby even this can be taken over by the community. But with this type of design, the recommendation is the use of radiant heating to keep the court free of ice and snow. Since the street is completely free of any parking, the cleaning and snow ploughing will be greatly facilitated.

Other Ramifications of Present and Proposed Type Provisions

Drawbacks of Present Regulation Stating Minimum Floor Area Requirements

To be able to afford the floor space, to live in the desired area, many deserving home owners are forced to forgo other amenities and even necessities. Some of these are external to the "home", but many are distinct features of the dwelling that help directly to make it a more livable place. Such items are a fire place, built-in features, better insulation, glazing, finishing, and the many technological paraphernalia discussed previously.

The minimum 1,200 square feet does not necessarily mean a healthier, safer, more comfortable or convenient, etc., home, than a 1,000 square foot home. Obviously, there is a limit beyond which this argument is no longer valid, and is not intended as an argument against space in low cost houses. On the contrary, we must do everything we can to increase space standards but the fact remains that the substitution of any one of the items mentioned for the extra 100 square feet of floor space, *at this level*, in terms of livability, may make all the difference in the world. Then, take the case of the rich man who needs only a small home, a 600 square foot efficiency unit that has incorporated all the latest technological household gadgets. It is not justifiable to prohibit the building of such a home solely on the grounds that he has not provided the minimum floor area.

There is no substitute for this regulation in the proposed provisions. The real need is for an adequate performance code which takes into consideration the design for livability¹ aspects of the home. However, if the minimum floor area specification is justified on the basis that this is to maintain a certain "character" in the area and thus assure the stable physical base for tax assessment and real estate

values, the contention is that the new provisions could be just as effective in maintaining character. Usually, the "inappropriate" design stems from the fact that the desired type and size of site is not available. These sites could be provided on a greater scale if the necessary flexibility is contained in the controls. The proposed provisions are an attempt to approximate fundamental design principles as near as possible to guide the subdivider to evolve a plan so that, in the words of Charles Diggs, "the street system and the lot layout are such to facilitate and render almost automatic the appropriate use of the various portions of the subdivision or the community"². Beyond this, no amount of justifiable controls could assure the desired "character", in the opinion of this thesis.

Drawbacks of Present Regulations Segregating Types of Dwelling

Another common ordinance is concerning "use" in the residential area, which segregates dwelling types into one, two, three or more family type units. This is to control density, to establish the types of "residential character", single family, duplex, row-house, etc., and to maintain values in accordance with these characteristics. However, insistence on the single-family unit in the area under concern, prohibits, or at least discourages, the carrying out of some very basic tenets of family and social responsibilities. For example, much is made of the problem of housing the aged, and the cyclical expanding and contracting phenomenon of the family during its life span. A floor space requirement discussed before, prohibits such "luxury" as raising one's family in that area by the very type of people most desirable who cannot or do not want a large house initially. It should be possible to build units to accommodate this cyclical change in family space requirements, and to allow the young couple to help finance their home by being able to build a "multi-purpose" home, renting space as not needed to the other young couples or to the aged, before and after their family raising period. This means no rigid specifications as to type, number of families per dwelling unit should be imposed.

The issue is how dependent is the maintenance of character and property value on the fact that a single type of dwelling exists in a certain district. The fact that residential real estate values are built on this premise may be valid but very unfortunate. The argument here is that the true values are as put forth in the considerations of site conditions, "the seemingly intangible relationship of the dwelling unit to its lot". In other words, it does not matter whether there is a duplex sitting next to a group of single-family units. The important point is the design of these units in themselves and in relationship to each other.

The proposed type of provision would allow building right up to the lot lines, which means that two units can be combined. But this "duplex" occupies two lots. The density remains the same as far as the number of units in the area is concerned. Then the proposed type of provisions do not specify the number of families per unit. Rather the recommendation is to state a minimum floor area per person as a supplement to the Floor Area Ratio to control actual density. Though this is still not right (since some families can, and prefer to, live in quarters that seem

¹ See Reimer, Suend, "Livability - A New Factor in Home Value", (Appraisal Journal, ARR. 1946) p. 148-158.

² Diggs, Charles H., "Zoning by Design", (Annals of the American Academy of Political and Social Science, Philadelphia, 1931) p. 83.

cramped to others), with this type of provision, the aforementioned young couple and the aged can be accommodated. So long as the FAR is not exceeded and the minimum floor area per person is maintained, the couple is

free to build a "convertible" unit as discussed above. Again, the basic need is for a performance type building or other code which takes into consideration the design for livability features of the home.

REQUIRED NEW BACKGROUND DATA AND OTHER CONSIDERATIONS

To fully benefit from the proposed type of provisions new data, besides a new attitude towards existing data, are required.

Local Level

The use of the following data have been discussed during the course of the above analysis. This data should be available from local engineers, surveyors, meteorologists, etc. If a planning agency exists, these should be available already compiled.

- | | |
|----------------|------------------------|
| 1. Demographic | 3. Climatological |
| 2. Topographic | Wind |
| Soil condition | Sun |
| Vegetation | Snowfall |
| Drainage | Rainfall |
| Contours | 4. Other site features |
| | Views |

Then the customs, habits and fashions, etc., the general social background is most essential as material to establish physical design standards for the area. For example, mention has been made as to the provision of outdoor space for living purposes. Apart from the climatological restrictions, local customs and habits as to how this area is used for outdoor living purposes will have great influence on the space requirements of the lot area.

Regional and/or National Level(s)

Specifically, much research is needed in the realm of lot space standards. The thesis recommended a minimum 40 foot lot width and a lot area three times the total building area. This was primarily for the purpose to make a fair comparison with the present type regulations. But the basis for such minimum provisions need factual background as to efficient plan forms of dwelling under varying site and other conditions, etc.

Other data that should be collected are of the same type but much of it is "informed" opinions. In this connection, much has been done by committees and organizations, such as the APHA, who have compiled architectural, engineering and other technological information as related to the design of dwellings and passed "informed" opinions. Other organizations such as the Bureau of Standards, the American Standards Association, the American Society for Testing Materials, and so on, have much data on the engineering aspects with "informed" opinions. These need to be compiled in form useful for purposes of evolving zoning and subdivision controls.

In the field of manufactured goods, the Consumers Union performs one of the most valuable information

services we have. They frankly assess and rate competitive products solely on their relative merits based on performance. A similar qualifying bureau needs to be set up for the evaluation of good residential design. Architects, planners, builders, social workers, etc., must co-operate for the proper evaluation of design, but each could pass informed opinions on many available examples strictly from their particular point of view. From these, a central bureau might classify and extract the essential data. A rough outline for a "page" of the handbook on design would have the following parts:

1. Background data as to location, size of development, cost and various conditions pertinent to the design.
 2. Enough graphic illustrations, composed of plans, sections and photographs, to show the various features of the design.
 3. A brief outline as to why the particular solution.
 4. A critical assessment of important facets of the design.
- The last is the most important item, as this information will be the basis on which value judgments will be made at the local level.

Future Technology

Many aspects of future technology are still very much in the conjectural stage. Atomic power has now been harnessed. If this form of energy becomes available on the large and cheap scale predicted, many new concepts of the residential area will develop. Snow and ice problems would no longer exist. Control of micro-climates may be a possibility. New methods of transportation will probably make the street obsolete. The future residential area may be completely independent of the land.

Highly conjectural, but at a "lower" level, there are already a large number of fairly well developed facilities which were thought to be impossible just yesterday that now need to be considered. Radiant heating of streets is gaining popularity in the large urban areas, eliminating the problem of ice and snow. The Fuller type house will demand a new subdivision concept. This circular house, completely transparent, will require new attitudes towards the definition of what is indoors and what is out. Completely self-contained packages water and sewerage disposal systems, chemically operated, are being investigated. This development will completely release us from the tentacles of the piped systems. Self-generated power units are already in vogue, even in areas where transmitted power is available for reasons of increased independence. The helicopter, the new "flying tubes" with airfoil de-

signs based on the principle of venturi tubes, which permit hovering, are already being manufactured; supplies limited only because of the present war emergency. These and others will make new demands on the use of the residential lots, hangars instead of garages, and a roof-top landing platform instead of the sun deck, and so on.

The demands of technology are usually accompanied by an additional freedom if we can assimilate them properly. A flexible framework is essential.

Some other Immediate Considerations

There are many immediate situations that are becoming increasingly perplexing. These are, as yet, to be fully accepted as problems related to residential zoning and subdivision controls, but they will need the proper attention if they are to be solved.

It is probable that in the future, for that matter today, we wish to assimilate public housing, veterans housing, defense housing, etc., into the fabric of the community. To integrate socially and economically these into a homogeneous residential pattern will make their demands on zoning or a new form of controls. To facilitate slum clearance and rehabilitation, temporary housing is needed for the "evicted". Only a proper zoning technique, based on performance standards will facilitate the fulfilling of such humane desires democratically.

Mass-housing, though nothing new, is beginning to provide more and more of the housing units. The completely pre-fabricated house presents its own peculiar problems. Basically, they are two forms of standardization used. In the first case, the standardization is carried to the extent

that the entire house is of a standard size, plan and form. The second standardizes only units or sections of the house. The second case will demand the optimum lot size and shape to permit as many variations as possible on that lot. The first presents another problem. The possibility arises that a variety of types and sizes is not available in any one area by the very nature of the product. Its bulk, distribution of producers, etc., may make it impractical to gather a variety at any one point. If only to assure that the endless monotony of the standardized unit will not be further accentuated by endless repetition, zoning and subdivision controls should have some measures to help the "uneducated" site planner, the small-scale speculator-builder and the layman, in making an aesthetic decision, if you will. It is not too difficult to imagine the probable character of any area without this proper guidance. Aesthetics do have an economic value.

Another trend in "homes" is the increasing use of trailers. It is estimated that there are over 500,000¹ permanent trailer homes, housing some 1,500,000 persons in the United States. However temporary this may be, these "residents" should be entitled to the benefits of any good residential area. Though the present number of "mobile" homes is largely due to the war emergency, and actually affect only a few "defense" areas, there is no assurance that a large number of these homes will not remain. We are concerned now with the tremendous increase in the mobility of the people,² and it is possible that we will be confronted with the problem of the "mobile homes" on a still larger scale.

CONCLUSION

The thesis has followed through the steps of the performance approach to establish residential zoning and subdivision controls. Throughout the analysis, the main concern was to provide flexibility in the provisions, to adjust automatically as it were, to the unique conditions of the site, of technology, of social policies and, above all, the demands of the individual's idiosyncrasies.

An attempt has been made to show in the graphic comparison that the application of the new type of provisions need not cost any more. In fact, in many instances, the precision type of specification has indicated areas in which savings can be made. Such items were paving cost, installation of utility lines, servicing of streets and so on. Depending on one's point of view, any economic advantage or disadvantage is believed to be a matter of shifting of responsibility from the community to the individual.

Admittedly, the proposed provisions do not guarantee

good design any more than the present regulations. Nor would the strict application of the provisions result in poorer designs. But, under the proposed type provisions, as far as can be shown, the designer has much more freedom, so essential if we are to enjoy better residential areas. Any limitations still apparent (and there are many) are mainly due to the inability to extract the essential elements to control. For example, the resort to specific spatial dimension to assure certain space requirements of lot size, width, lot lines indicate this drawback.

Many shortcomings of the thesis are apparent which in most cases can be eliminated. Certain views are, comparatively speaking, subjective in nature. For example, many would object to the substitution of mechanical ventilation for natural, the indices used for outdoor space, etc. Also, there is too much reliance on the graphic illustrations to prove a point. This in itself is not a major fault, but the illustrations themselves leave much to be desired. Reference to actual designs would be better to illustrate these points.

In any case, certain recommendations are in order besides those already mentioned in the previous section. These are listed in order of their immediate applicability.

¹ Boston Globe, November 10, 1951.

² The previous discussion on floor area and use restrictions shows that zoning restrictions do contribute to this problem of increased mobility of the people. The family is forced to move around to find suitable accommodation at every stage of the family cycle.

1. Integration of zoning and subdivision controls or at least a better co-ordination between the two is needed. This is best illustrated in the design of that area between the building lines or the right-of-way. The requirements of the street, the lot and dwelling, must be considered together.
2. The provisions of the street and lot requirements should be more detailed and precise and not the reduced average of all conditions, related or not. Only then can the designer be free to use his imagination to design better residential areas. In this connection, the language used could be more connotative as illustrated in the introduction.
3. Performance type building codes should be adopted and zoning and subdivision controls complement these. In any case, technological developments should be recognized.

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ACKNOWLEDGEMENTS

The author wishes to express his sincerest appreciation to: The Royal Architectural Institute of Canada, College of Fellows, for the scholarship which enabled the continuation of formal studies and hence undertake this thesis.

Professor Burnham Kelly, Department of City and Regional Planning, M.I.T., for his constructive and enlightening criticisms throughout the course of this thesis.

The several who contributed their valuable time and money to assure my stay in the United States.

My wife, for her indulgence.

Boston Back Bay Center

Architects Collaborative
Pietro Belluschi
Walter F. Bogner
Carl Koch & Associates
Hugh A. Stubbins, Jr.

IN THESE DAYS of civic centres and the reorganization of urban areas to cope with the motor car and the shopper, the proposed Boston Center is of more than ordinary interest. The site of thirty acres became available through the purchase of the yards of the Boston and Albany Railroad in the Back Bay section. The group of buildings seems to have every hope of realization, and will be shared between private interests which own the site and the city which may undertake the circular auditorium. The cost is estimated at \$75,000,000.

The plan is still undergoing changes, and may well do so for some time when one considers the magnitude and complexity of the problem. Traffic alone involves an under-

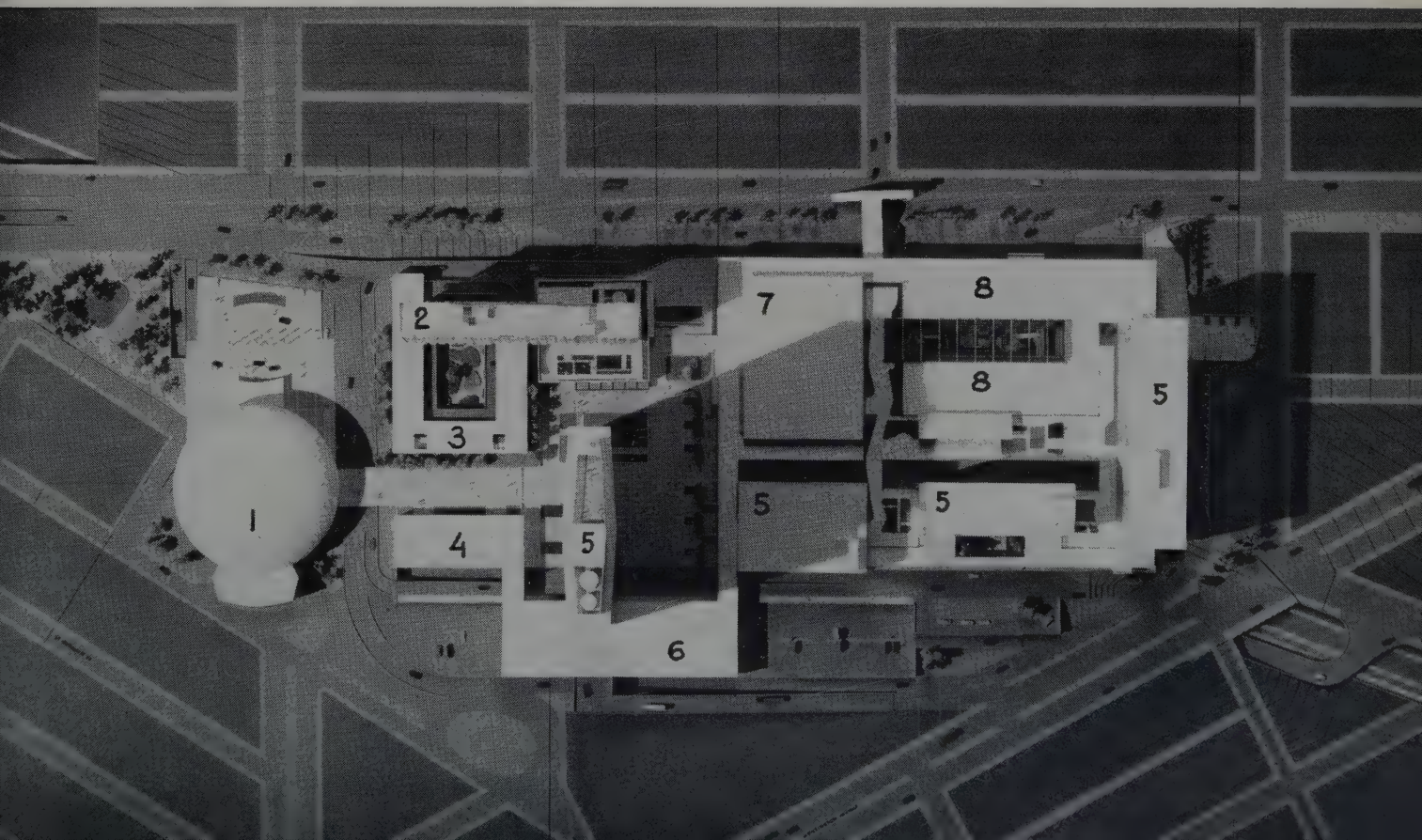
ground railway, 70,000 persons per day and the housing of 6,000 cars under cover.

A real urban innovation is the motel attached to the hotel. It will be a motel in the usual meaning of the term with a roadway and two levels of rooms enclosing the hotel garden.

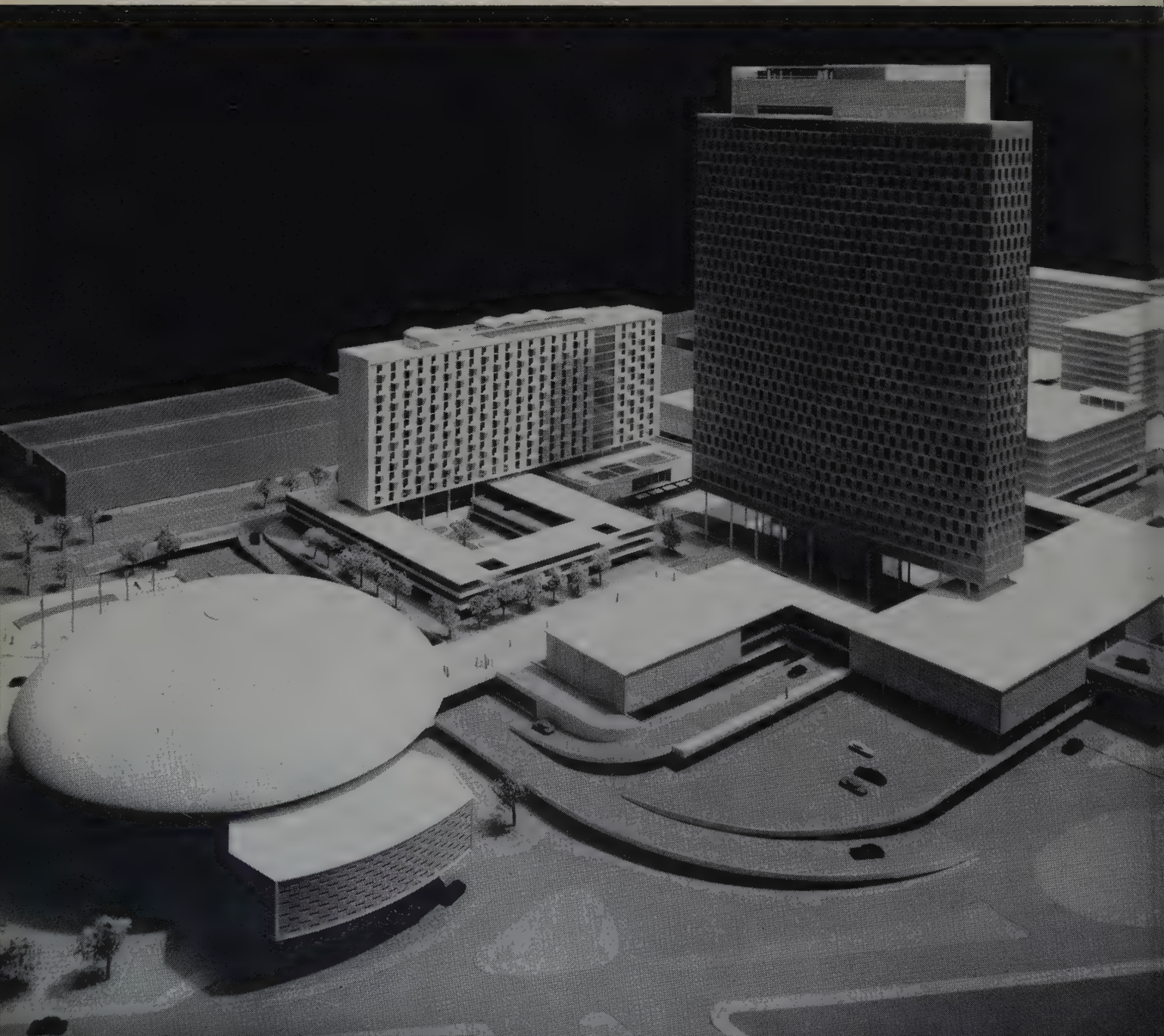
In spite of the modern tendency to decentralize shopping, the shopping centre plays an important part in the general plan. All shops will be within a 500 foot circle and will adjoin the department store. The promoters claim that the distance from parking to shops is unequalled in any shopping centre outside the city.

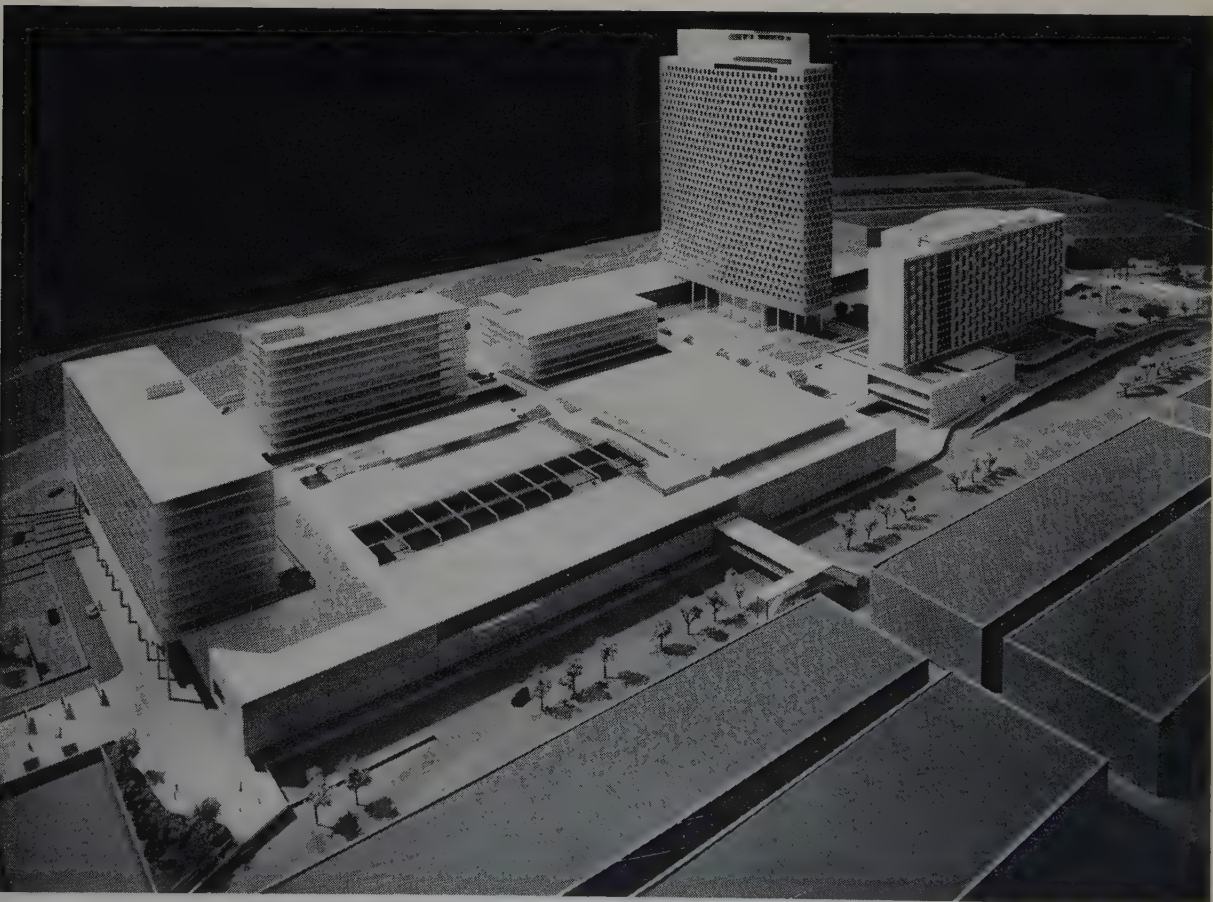
- 1 Convention Hall
- 2 Hotel
- 3 Motel
- 4 Exhibition Building

- 5 Office Buildings
- 6 Service Building
- 7 Department Store
- 8 Shopping Center



Reference numbers to the buildings illustrated on these facing pages are to be found on the model, page 365.





ROBERT D. HARVEY

CALENDAR OF EVENTS

Annual Meetings of the Provincial Associations:

Alberta, Macdonald Hotel, Edmonton, January 29th, 1954.
Manitoba, Fort Garry Hotel, Winnipeg, February 20th, 1954.

Ontario, Royal York Hotel, Toronto, January 22nd to 23rd, 1954.

Quebec, Chateau Frontenac, Quebec City, February 4th to 6th, 1954.

Annual Assembly of the RAIC, Mount Royal Hotel, Montreal, Quebec, May 11th to 14th, 1954.

British Architects Conference, Torquay, May 26th to 29th, 1954.

86th Convention of the American Institute of Architects, Statler Hotel, Boston, Mass., June 15th to 19th, 1954.

ONTARIO

Right now, around the metropolitan Toronto area, there is developing a surprising set of examples of how buildings and building types are affected by automobile transport; visually and functionally; in terms of aesthetics and in terms of everyday life.

The traveller on the northern cross-town thruway finds himself involved in a most dramatic shift in scale. The great road swoops and arcs through a vast tight carpeting of little ranch houses and bungalows, each in its own corral. The thruway itself acts like a dividing wall, but unlike the medieval wall, it gives no quality of the inside and outside of the city, it merely interrupts the equal march of the little houses, which begins again, exactly the same, on the other side.

A new building form, the shopping centre, appears in more and more places. A long stretch of one-storey shop fronts with high intensity lighting, can be seen distantly across a sea of asphalt or a sea of cars. Divorced from its surroundings, the shopping centre has a remote island quality. It suggests its presence at great distance with the beacon lights of its advertisements. Only after negotiating the parking lot, leaving the car, and heading for one of the beacon lights on foot, does the shopping centre begin to take shape as a building.

In the central city, the traffic-clogged streets now enable the stalled motorist to appreciate once again the formally composed and symmetrical building with its elaborate entrance treatment. But heavy traffic is creative to a degree. We have parking meters added to the usual collection of street furniture. And the block pattern of a hundred years ago is being twisted and torn to new uses by the cars and trucks. Instead of a block of small buildings with their own service plan, two or three blocks together will act as parking lots or service blocks to the next two or three which will have office towers shooting up, cheek by jowl.

A whole new set of demands and a new set of relationships are being forced on the designer of buildings, which go far beyond the structure and its immediate site. What about the city planner, you say? Well . . .

The real shocker in car-dominated city life is the lonely and formal pattern that is created. Without a powerful machine, the individual may be four hours' walk from the job or an hour's walk from the store. He would be equally remote from the centres of the city's life. But, of course, the dispersing effect of automobile transport is now being counteracted by the centralizing effect of television. One can always sit back on an old saddle in the ranch house and watch the singing cowpokes on TV.

W. S. Goulding

ANNUAL MEETING OF THE OAA

January 22nd and 23rd, 1954

The chairman of your 1954 Convention recently had the opportunity to visit Detroit to make arrangements for the panel discussion on civic centres.

In discussing the background of the Detroit Civic Centre, one thing was strikingly evident: It takes a long time and a great many interested people to bring a worthwhile scheme to fruition. The Detroit Civic Centre has been a dream for fifty years but no actual planning was begun until 1923. Construction commenced near the end of World War II. Now, one building is complete, another is enclosed, and architectural work is proceeding on two others. The Detroit Civic Planning Commission, assisted by an advisory board of architects, all working on their own time, have provided the overall planning. The Veterans' Memorial Commission and various firms of architects are responsible for the administration and execution of the work.

In the words of Mr W. S. Maybee, secretary of the Veterans' Memorial Commission:

"You have to think big. You're planning for hundreds of years into the future. There is no room for petty political or architectural differences. You have to get all the citizens to work together and keep at it year after year. We started out in 1923 with a single building in mind. Today we are well on our way to creating a new heart and nerve centre for our city."

Our profession bears a great responsibility toward the community. We cannot be content with designing individual buildings for individual sites. We must see our cities planned for a greater unity and coherence. It is up to us to influence and direct public opinion which makes these possible.

That is the theme of your 1954 Convention. Here is a brief outline of the program:

Friday, January 22nd:

9:30 a.m. — Registration and the annual general meeting.

Toronto Chapter Luncheon — Our guest speaker will be George Bain Cummings, Secretary of the American Institute of Architects, who will discuss the architect's responsibility to himself and to the public.

The afternoon session will be devoted to a panel discussion of civic centre planning and design. This panel will include civic and provincial planning authorities and members of our own profession to discuss the general principles of civic centre design for a community of any size from small town to large city.

Saturday, January 23rd:

The annual tour will visit the Don Mills community — a future satellite town of 35,000. This is the most extensive and thoroughly planned community of its kind in Canada. It offers many lessons for the future development of our towns.

After lunch we will have a seminar on shopping centres conducted by Kenneth C. Welch, AIA, Mr Welch is consultant on many large developments of this nature.

Finale: Annual Dinner and Dance.

Robert G. Calvert

Chairman, OAA Convention Committee

WESTMINSTER ABBEY APPEAL FUND

Mayor's Parlour,
Westminster City Hall,
Charing Cross Road, W.C. 2
November 10th, 1953

C. J. G. Carroll, Esq.,
Secretary,
Royal Architectural Institute of Canada.

Dear Sir:

It gave me the greatest pleasure to receive your letter of October 21st, together with the Bank of Montreal Draft No. 21072 for \$440.03 and detailed list of contributors from some of the Provincial Associations of the Royal Architectural Institute of Canada.

I am indeed grateful to all those who contributed to this amount, in support of this Fund, for their generosity, and to you and all the others who helped to organize its collection.

As you say, it a most fitting project, and it is particularly heartening to us all to know that our efforts to preserve our ancient and well-beloved Abbey are being actively shared by those from Canada.

Would you be kind enough to convey my personal thanks to everyone concerned.

Yours sincerely,

Charles P. Russell

*Mayor and Deputy High Steward
of the City of Westminster*

**CANADIAN CONFERENCE ON PRESTRESSED CONCRETE
January 28th and 29th, 1954**

Architects will share with engineers the interest being shown in the Canadian Conference on Prestressed Concrete being held at the University of Toronto on January

28th and 29th, 1954. A committee headed by Professor Carson F. Morrison of the Department of Civil Engineering has prepared a program which will provide a concise review of prestressed concrete of definite value to Canadian engineers, architects and contractors.

Among the papers being presented is a discussion of the economic aspects and applicability of prestressed construction, by Mr R. F. Shaw, Vice-President, Foundation Company of Canada. Mr R. B. Young, Concrete Consultant, Hydro-Electric Power Commission of Ontario, will deal with Quality Control of Concrete, and Professor M. W. Huggins, Department of Civil Engineering, University of Toronto, will discuss Quality Control of Steel. A feature of the conference will be a paper of great significance, by Professor G. Magnel of the University of Ghent, a world-renowned expert in this field. The question of the desirability of establishing, at this time, a Canadian specification to regulate the design of prestressed concrete members will receive careful consideration.

A joint meeting of the Royal Canadian Institute and the Toronto Branch of the Engineering Institute of Canada, open to the public, will be held in Convocation Hall on the Saturday night. It will feature an address on Prestressed Concrete Arch Bridges in Venezuela by Mr Robert Shama, Chief Engineer, Empresas Campenon Bernard de Venezuela, Caracas.

Further information may be obtained from the Department of University Extension, University of Toronto, Toronto, Ontario.

LETTER TO THE EDITOR

Sir:

On page 343 of your November issue you note the names of two distinguished members of the profession who were honoured with Coronation Medals.

I was similarly honoured, but not, alas, for my professional prominence, but as the Commanding Officer of a field artillery regiment (the 29th, Self Propelled, of Toronto). Which, in the time honoured fashion, reminds me . . . I was at one time sitting in an OP north of Ortona, in not-so-sunny Italy, where the 1st Division stopped for a wet winter in early 1944; feet up on a window sill, idly directing the fire of a troop of field guns at some historic old buildings, which might possibly have had a few jerries in them, when up came my line maintenance crew bringing with them the mail. Mine consisted of an invitation to a tea, in London, being given by the Society for the Preservation of Ancient Buildings.

O Mores! etc.

Yours very truly,

Blake H. M. Tedman

NOTE FROM THE EDITOR

For some time we have thought of pointing out to our architect contributors a few of the problems of the *Journal* where they could be of great assistance. They probably know that, unlike the technical magazines, the *Journal* is laid out and set in less than a month before the date of issue. Every issue, therefore, represents a minor crisis involving telegrams, air mail letters and telephone messages. But this note is more than a plea for architects to meet a

deadline either for illustrations or articles. We have been criticized for publishing rough plans that were never meant for reproduction, but our critics were unaware that the *Journal* printers were waiting hourly for those plans, and that no time was available for re-drawing. We believe that all architects are proud of their *Journal*, and we would ask them to take some pains with plans.

On the other hand, many plans have been carefully drawn for reproduction, but the draftsman gives little thought to reduction. We prefer to see rooms named on the plan to figures with a legend, but very rarely is lettering large enough to be legible when reduced. If thought were given to lettering, we would not be forced to print the use of rooms beside the plan.

We would also ask our literary contributors to tread warily with capitals. Words like architect, art, town planning, architecture, board room, cafeteria, washroom, secretary or manager are ordinary English words that need no emphasis by capitals. These are but a few examples in a hundred that have to be changed every month before they reach the printer. Punctuation will, probably, always be a function of the *Journal* office, and it is done willingly, but the matters referred to above, if watched by the contributor, could save much time and embarrassment.

Having got this off our Chest, we wish both Contributors and Readers of the *Journal* a very Merry Christmas and a Happy New Year.

CONTRIBUTOR TO THIS ISSUE

Kiyoshi Izumi, B. Arch., M.C.P., (M.I.T.), A.R.I.B.A. Since his graduation from the School of Architecture at the University of Manitoba in May, 1948, Mr Izumi's impressive record of accomplishments and honors in both research and practical work has written the first chapters of what might well be referred to as a real "success" story. Nevertheless, all those who know him and have worked with him realize that the story of his progress and achievements is far more than a mere success story. This progress and these achievements are the result of diligent effort and sincere thinking based on the deep and abiding conviction that it is the architectural designer's duty and privilege to create better, more healthful, safer and more efficient surroundings for his fellow man.

Extensive research into the theories and practice of housing in Europe while studying in England and on the continent, as the winner of the 1948 Pilkington Glass Scholarship, enabled Mr Izumi to lay the ground work for his subsequent study and research in the School of Planning at the Massachusetts Institute of Technology. The year and a half at the latter institution was made possible when he was chosen, in 1950, as the first winner of the Royal Architectural Institute of Canada College of Fellows fellowship.

Since his return to Canada, he has worked mostly in Regina, in the office of H. K. Black, architect and engineer. Recently, he has set up his own office in Regina for the professional practice of architecture and planning.

This experience in Regina, plus his earlier experience in Calgary in the office of Rule, Wynn and Rule, architects, has included the design of general and mental hospitals, schools, a newspaper plant, stores, churches, a university library, apartments and radio station facilities.

In the field of planning, he has had considerable experience both with the Winnipeg Town Planning Commission Metropolitan Plan, and as the principal planner for the Master Development Plan of the City of Fairmont, Minn. This experience has included various phases of city planning from conducting field surveys to final designs for such projects as subdivisions, mass housing, school plant distribution, commercial centres, community centres, etc. He has also worked on urban redevelopment projects, neighbourhood planning, zoning and subdivision regulations, new town projects, and other detailed aspects of city and regional planning.

Mr Izumi is a member of the Royal Architectural Institute of Canada, an Associate of the Royal Institute of British Architects, and a member of the American Institute of Planners, the American Society of Planning Officials, the Community Planning Association of Canada, and the American Society of Political and Social Sciences.

He is an outstanding young Canadian in the field of architecture and city planning, one from whom we can rightly expect vital contributions to the welfare and progress of our Canadian community.

Ever since its formation in February, 1941, the College of Fellows has had as its objective the establishing of scholarships that would be open to graduates of Canadian schools of architecture and that would make possible further study, travel and research designed to improve Canadian architecture generally.

By the year 1949, it became practical financially to offer the first such Scholarship, with a value of \$1500.00, and an encouraging number of applications were received. The problem of selection was difficult as it required consideration not only of academic achievement and the purpose to which the funds would be devoted, but a very serious effort to appraise character and the likelihood of the successful applicant becoming an honourable member of his chosen profession. This screening process required the examination of numerous confidential reports which provided valuable character analysis.

It will be understood, therefore, that the first winner's continuing success is a matter of pride and satisfaction to the College of Fellows.

John A. Russell

FUTURE ISSUES

January	Don Mills Development, Ontario
February	Students' Union, Victoria College, University of Toronto
March	Students' Issue — University of Manitoba
April	Hospitals
May	Schools

*I want the same efficient
acoustical material used in
broadcasting studios!*

**Good! We'll specify
Johns-Manville
Acoustical Ceilings!**

Made of asbestos, J-M
TRANSITE ACOUSTICAL
PANELS are particularly
resistant to fire and
moisture, and provide
noise-quieting ceilings
that are exceptionally
flat and true.

**Johns-Manville Acoustical Ceilings effectively reduce noise . . .
readily installed in new construction or over existing ceilings,
they assure quiet and comfort plus attractive appearance**

Controlling sound in such widely diversified places as radio studios, restaurants, hospitals, offices and schools is nothing new to Johns-Manville. They have been doing it successfully for over 35 years. That's why hundreds of *satisfied* customers, all over Canada, point with pride to their J-M Acoustical Ceilings.

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Johns-Manville *Pioneers in Sound Control*

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to meet the needs of growth

*"Every month
I find new
reasons for
approving them"*



JANUARY



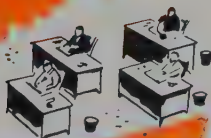
"Maintenance department reports less cleaning time with new Westeel Hudson partitions."

FEBRUARY



"J. B. very impressed by our 'rich, solid-looking' new offices—everyone likes them."

MARCH



"Increasing facilities to accommodate new clerks. Lucky those permanent-looking Westeel partitions can be moved so easily!"

APRIL



"Surprised, they moved the door into the corridor nearer the front lobby—must have done it overnight."

MAY



"Had small fire in paper stock room—proved Westeel partitions are fireproof."

JUNE



"Office manager happy again. Well insulated partition stopped noise back of his sanctum."

JULY



"Portion of corridor wall removed until end of summer lull. This will allow through-draft during hot weather."

AUGUST

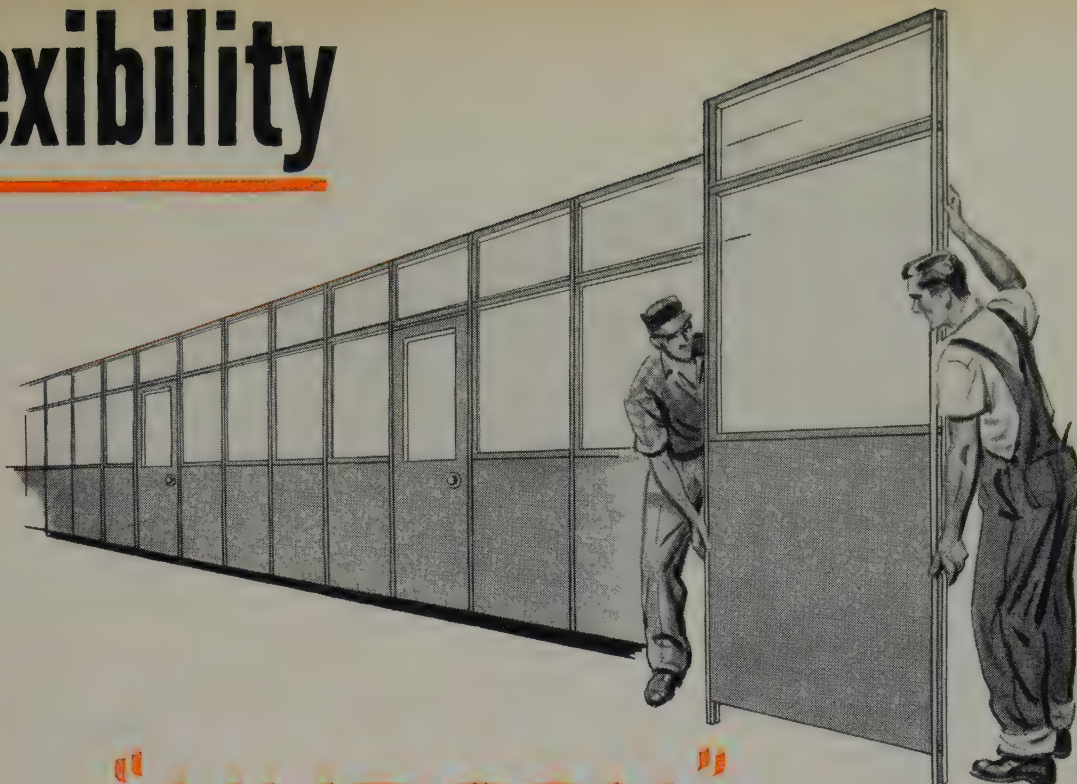


"Found re-wiring intercom. easy—learned that Westeel partitions have wiring space in all vertical and horizontal members."

WESTEEL

MONTREAL TORONTO WINNIPEG REGINA

nd flexibility



"HUDSON"

WESTEEL'S

New FLUSH PARTITIONS

SEPTEMBER



"Architect's choice of colours so 'right' for partitions in our offices—understand he can get any colour he wants in Westeel partitions."

OCTOBER



"Discovered how easy they are to wash when I had laboratory's Hudson partitions washed for the first time."

NOVEMBER



"Decided to substitute solid panels for glazed ones between Smith and Accounting, can use his to enlarge draughting office."

DECEMBER



"Tenants in rented section happy with new arrangement of offices—surprised how easily the partitions can be moved to meet requirements."

Westeel's Hudson Flush Partitions provide an efficient and economical means of dividing large areas into attractive offices and other working units.

Hudson Partitions are *permanent* in the sense that they will last as long as the building. They are *temporary* in the sense that *all sections*, or any section can be moved and relocated wherever desired.

These flush construction partitions are free of dust-collecting projections. Their architectural lines are simple, pleasing and practical. They provide a perfect complement for any type of modern interior furnishing.

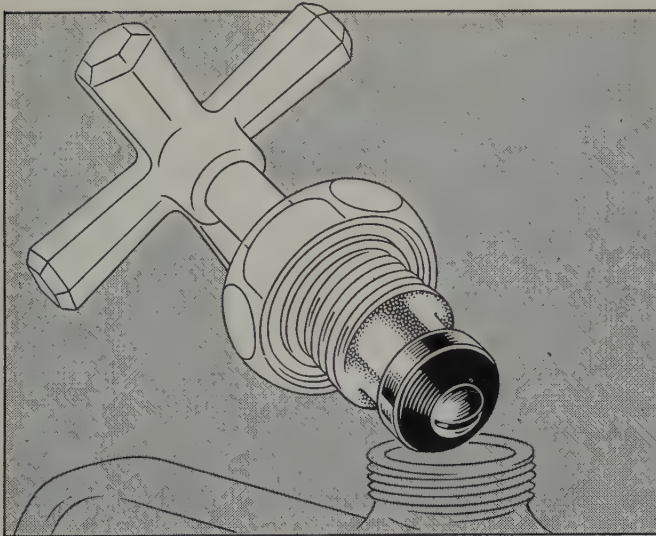


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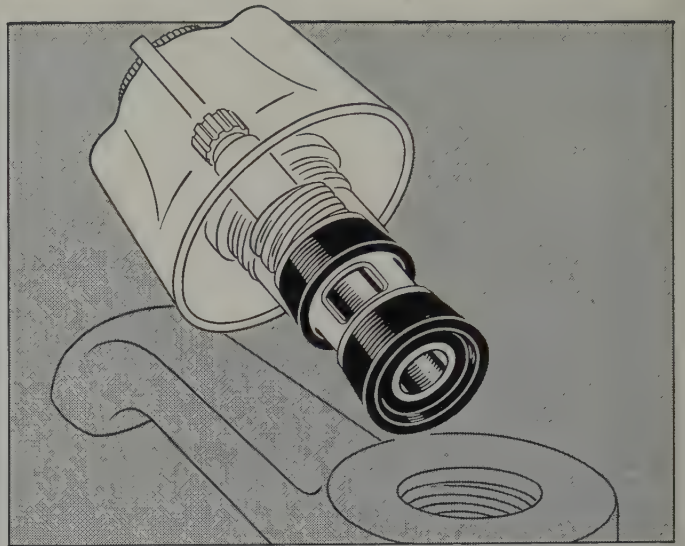
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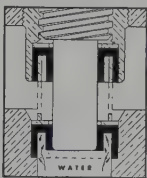
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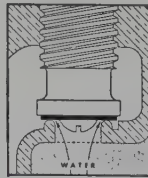
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With faucet closed, water pressure squeezes lower seal against stem to prevent drip through spout. With faucet open, water pressure acts on upper seal in the same manner to prevent stem leak. No valve-seat — therefore no wire-cutting.

ORDINARY PRINCIPLE



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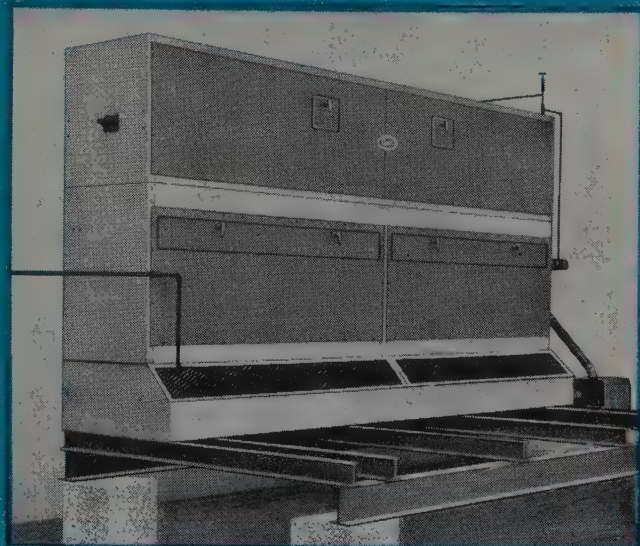


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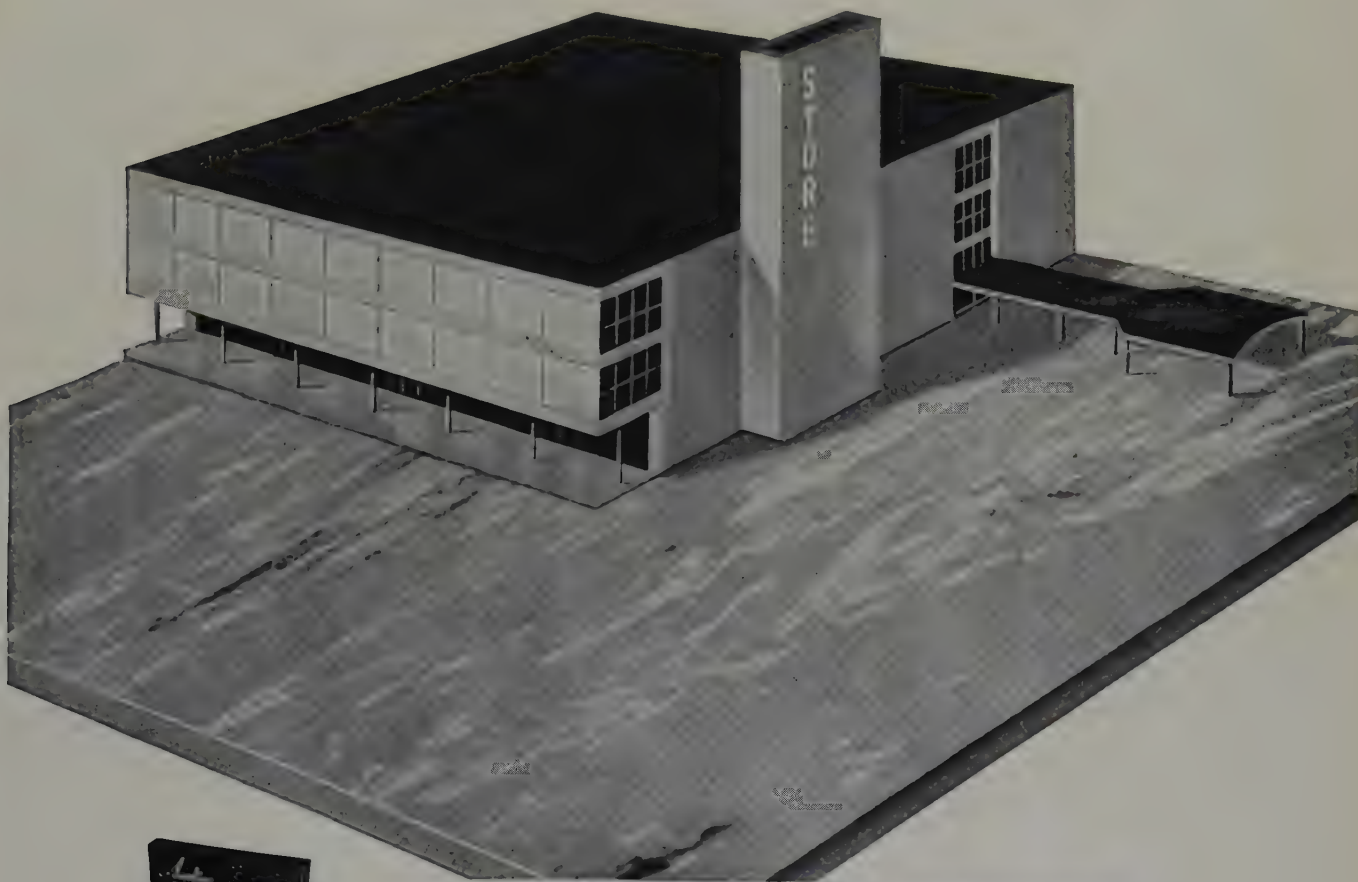
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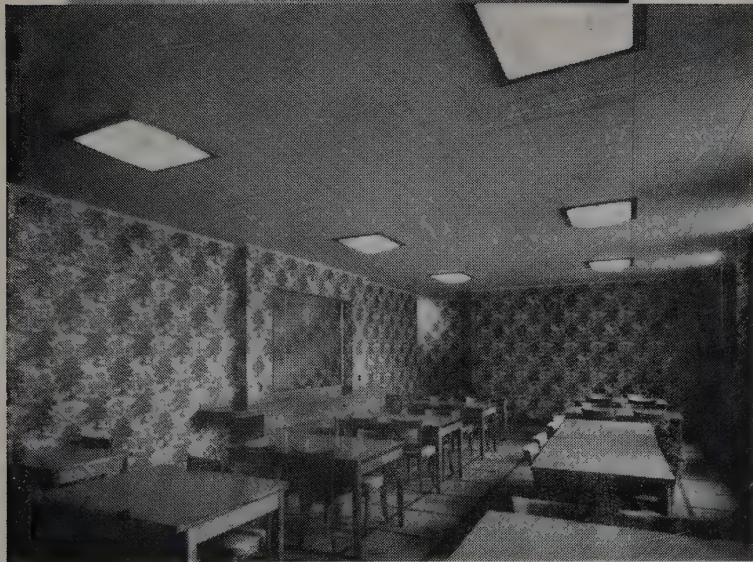
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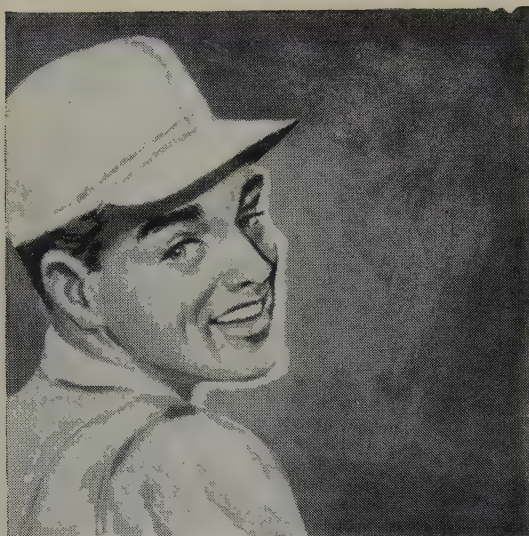
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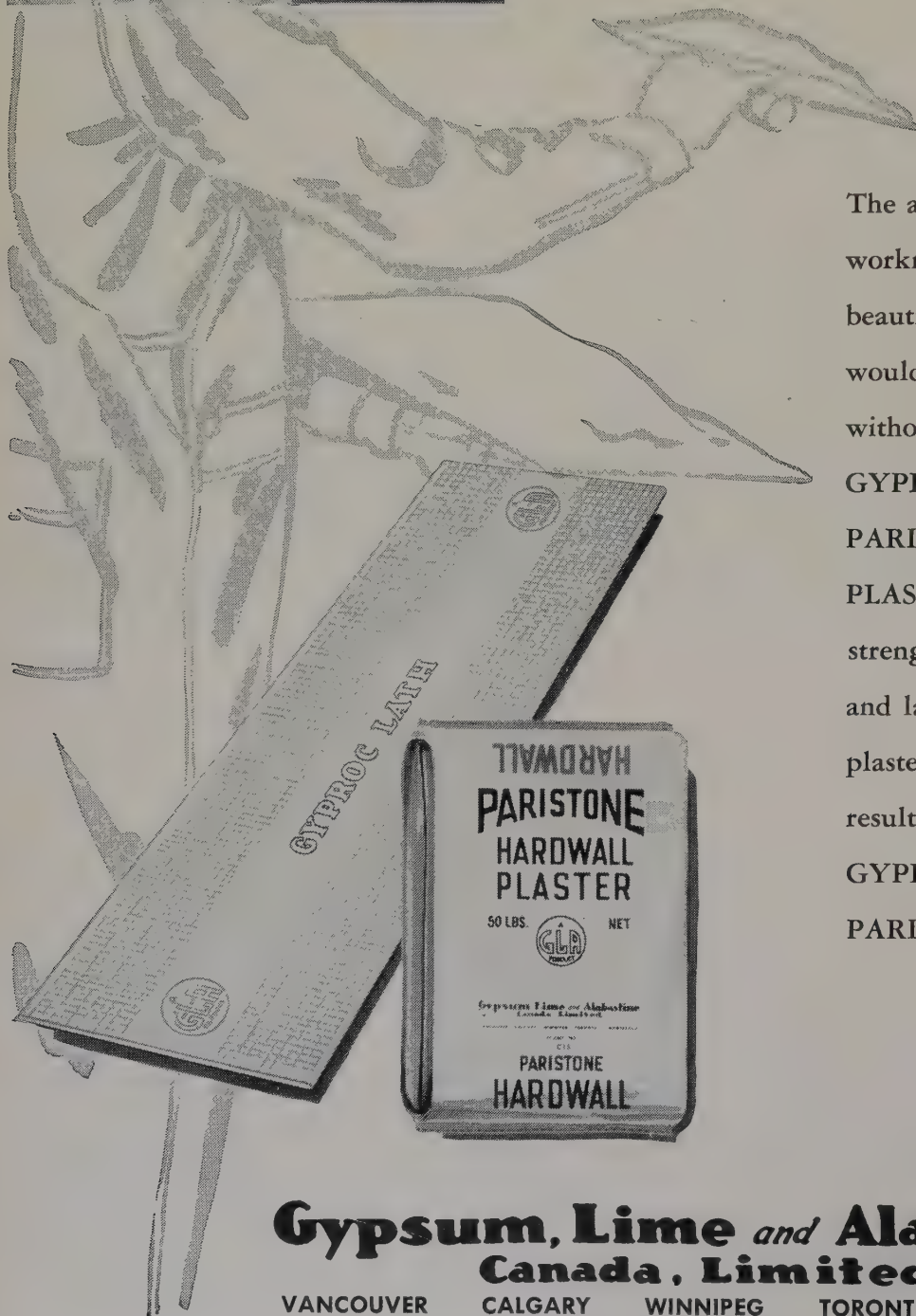
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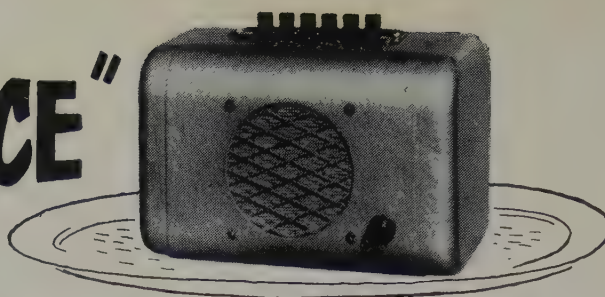


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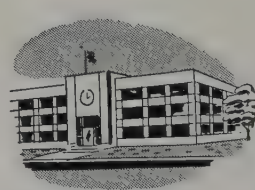
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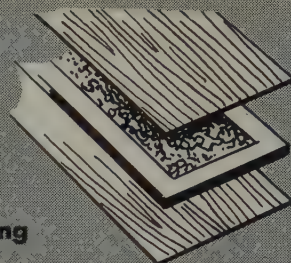
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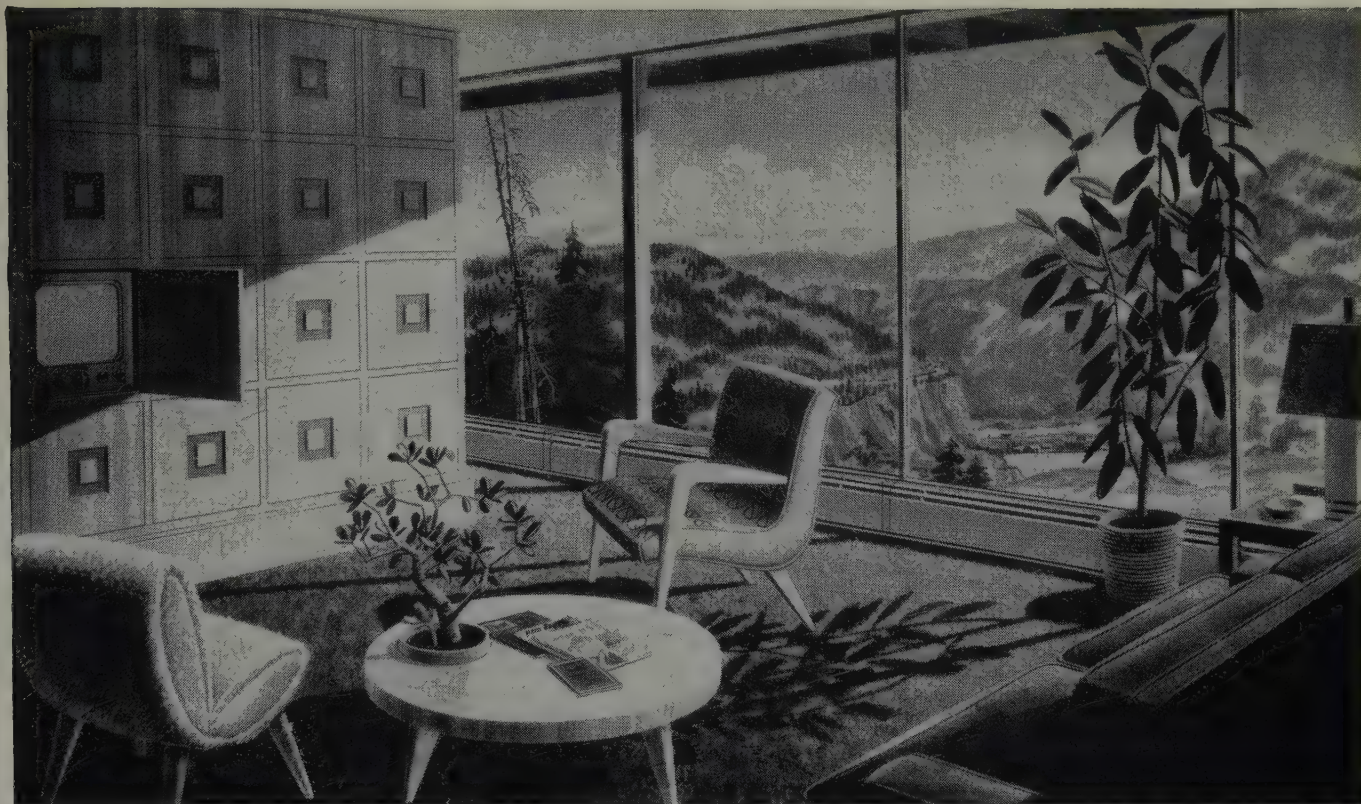
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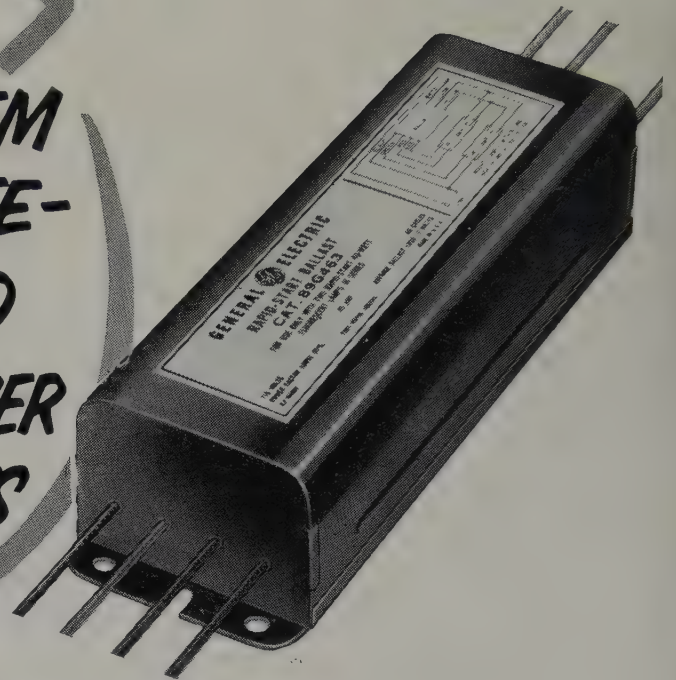
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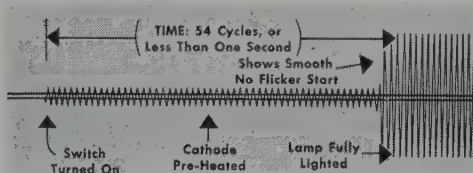


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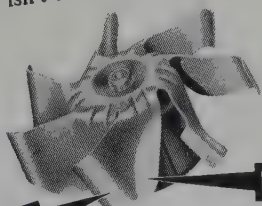
This, of course, is somewhat exaggerated, but it's an absolute fact that it takes more than plumbing to make a good bathroom. Architects everywhere are specifying Blo-Fan for the bath, because it draws off excessive heat and humidity. It keeps walls from sweating and mirrors from fogging. It prevents embarrassing odors from spreading throughout the house.

Blo-Fan Model 206, designed especially for bathroom installation, is a low-cost, economical unit that pays for itself by keeping the bath looking like new for years and years... And, it pays off, too, in cleanliness, comfort and better living.

Two other Blo-Fan models, the No. 208 and No. 210, are also available for installation over the points of air pollution in the kitchen, game room and laundry. Model 210 is equipped with the NINE-SPEED switch, an exclusive Blo-Fan feature, which allows Mrs. Housewife to control the rate of ventilation as easily as she does the speed of her automobile.



Remember, if it hasn't got this blade it isn't a Blo-Fan!!!



BLOWER **FAN**

This patented Blo-Fan blade combines both fan and blower principles to move more air—quickly, quietly and efficiently!!!

Blo-Fan*

*TRADE MARK REG.

C.S.A. APPROVED

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the "OHIO" and "BATHURST"
are the tubs for first consideration

Strong and rigid, one of these porcelain-on-steel bathtubs is only about $\frac{1}{3}$ the weight of a cast iron tub of equivalent size. That means lower installation costs and much easier handling.

THEY'RE THE ONLY ANSWER

to many a remodelling job where it is desired to add a bathroom without increasing flooring supports.

THEY'RE LIGHT—AND THEY'RE LASTING

—heavy 12-gauge steel assures rigidity and sturdiness. Reinforced construction gives maximum strength. Stain-proof porcelain enamel surface cleans easily. Integral wall guard prevents water seepage.

Full details conveniently available in your Plumbing Fixtures "Blue Book".

**WHERE
LIGHT WEIGHT
IS AN IMPORTANT
FACTOR...**



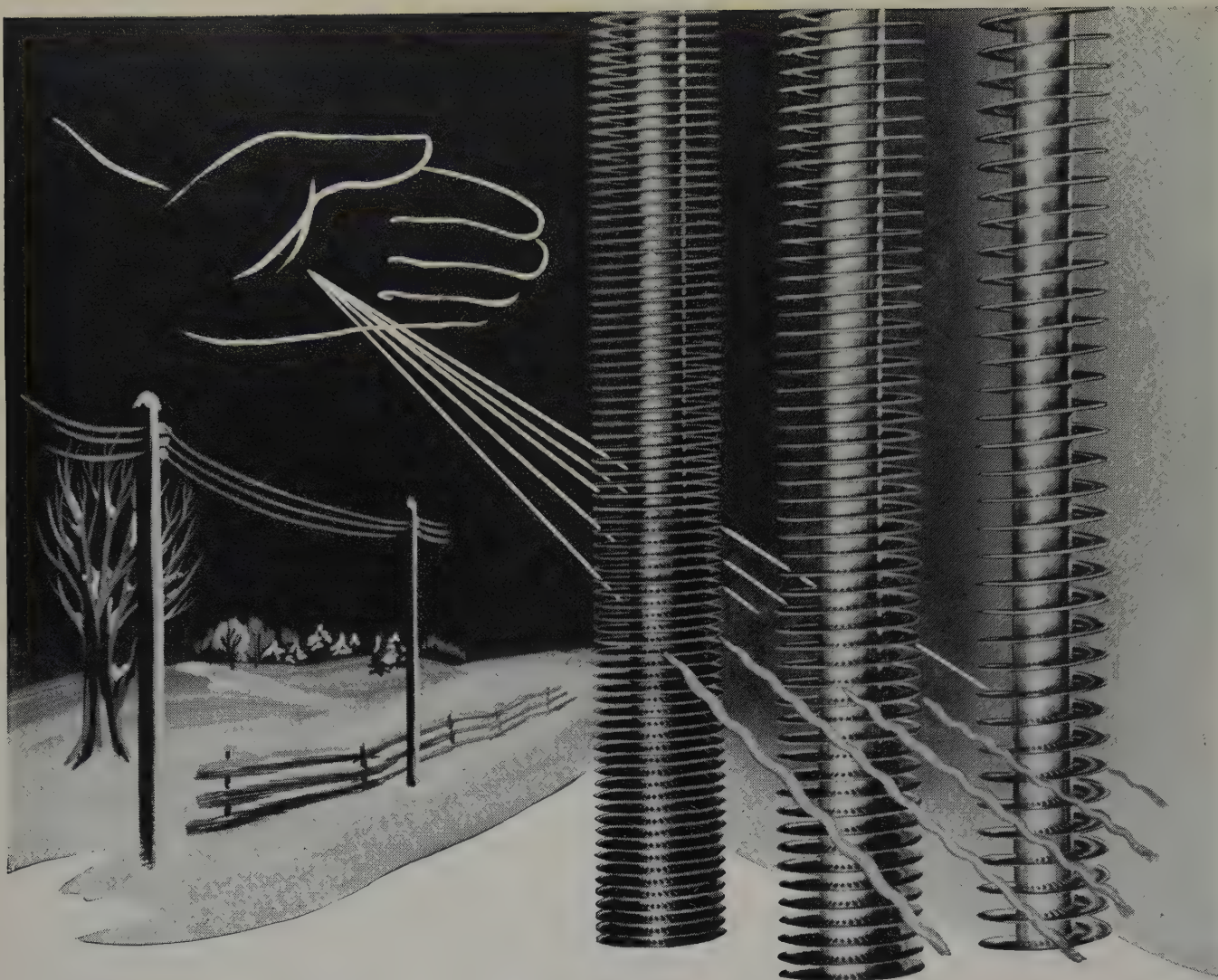
At left, "Bathurst"; above, "Ohio" with wide flat rim for convenient seat.

**A PORCELAIN-ON-STEEL
PRODUCT**



IN WESTERN CANADA
ALLIANCEWARE, LTD.
VANCOUVER, B.C.

IN EASTERN CANADA
**CRANE STEELWARE,
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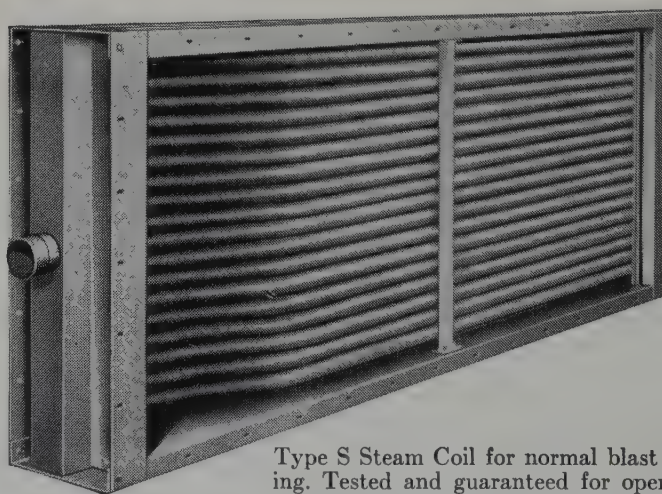


Canadian Sirocco Heating Coils check winter's icy hand.

They're quality-built. All tubing is helically wound with copper or aluminum fins in three standard spacings (see above). Coil casings are made of heavy galvanized steel; headers are of die-formed steel.

Whether the coils you recommend are for blast heating, zone reheating or whether you want return bend coils or coils for modulated steam control—you'll find the size and type that best fits your clients' needs in the Canadian Sirocco line. Write for further data.

CANADIAN SIROCCO COMPANY, LTD.
310 ELLIS STREET, WINDSOR, ONTARIO



Type S Steam Coil for normal blast heating. Tested and guaranteed for operation with steam up to 200 lbs. gauge pressure and 450°F temperature. Die-formed tube support protects tubes. Write for Bulletin B-1218.

YOUR BEST BUY CANADIAN SIROCCO AIR HANDLING EQUIPMENT



Anaconda

HELPS PUT WASTE HEAT TO WORK!

A heat pump installation of widespread interest is now operating in the new wing of the Commercial and Technical High School, London, Ontario. It was found to be the practical solution to a specific problem with the ability to effect economies right from the start.

Heat reclaimed from exhaust air in the ventilating system is employed to warm the floor area of the shower room, around the pool and the water for showers and pool. In summer, the pump provides cooling capacity for air-conditioning the cafeteria. At the same time it uses the extracted heat along with that taken from the air through coils on the roof to heat shower and pool water.

Anaconda Copper Tube, because of its heat transfer properties, corrosion resistance and consistent uniformity, acts as a connecting link with the many mechanical units of the project. Copper tube is also an essential part of the heat exchanger coils, compression equipment and condensers.

Commercial and Technical High School, London, Ont.

Architect: Robert B. Schoales

Consulting Engineer: Nicholas Fodor

Consultant: Dr. A. D. Misener, University of Western Ontario



FOR COPPER AND ITS ALLOYS consult ANACONDA



The heart of the installation is the heat pump.
This equipment supplied by John Inglis Co. Limited.



View of the cafeteria, air-conditioned by means of the heat pump.



Floors of
brighter beauty,
that endure
for years!

with



Vinyl

FLORTILE



CREATING entirely new standards of value underfoot, B.P. Vinyl Flortile is a quality tile of the vinyl plastic-asbestos type. It combines in ONE product the most desired features of today's finest floorings.

B.P. TECHNICAL SERVICES are always available to aid in the solution of any particular flooring problems and to provide authoritative advice on any special applications. Write P.O. Box 6063, Montreal, or P.O. Box 99, Winnipeg.

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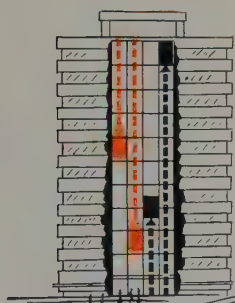
BUILDING PRODUCTS LIMITED



AUTOTRONIC®

Without Attendant
ELEVATORING

**PROVIDES
FREQUENT
UP
SERVICE**



*Car balance alternates between 3 cars down, 1 car up;
and 2 cars down, 2 cars up*

HEAVIER DOWN PROGRAM
for the OUT-TO-LUNCH rush



**MAINTAINS
MORE
DOWN
CARS**

Autotronic—WITHOUT ATTENDANT—Elevating keeps service predominantly down at the start of morning and afternoon coffee breaks and lunchtime periods. At the same time, it continues to provide frequent up service.

A Heavier-DOWN program is illustrated above. 4 cars are shown operating on a 30-second dispatching interval.

The car balance alternates between 3 cars down, 1 car up; and 2 cars down, 2 cars up. This is accomplished by keeping the cars equally time-spaced. In this case, 30 seconds apart.

The down trip, with frequent stops to pick up passengers, takes 75 seconds. The return trip, because of lighter traffic demands, takes only 45 seconds.

The fast return trip and automatic features of Autotronic supervision keep the cars equally time-spaced and maintain the alternating car balance.

Another program, Heavier-UP, keeps service predominantly up at the end of coffee breaks and lunchtime periods.

These two programs are exclusive Otis Autotronic features.

Autotronic—WITHOUT ATTENDANT—Elevating saves up to \$7,000 a car, each year. 6 automatic programs operate the cars as a coordinated group. Program selection can be completely automatic. Diversified traffic can be handled in large, or small, office buildings, hotels, and hospitals. Ask any of our 21 Branch Offices across Canada about new or modernized installations.

Otis Elevator Company Limited, Head Office and Works: Hamilton, Ontario.

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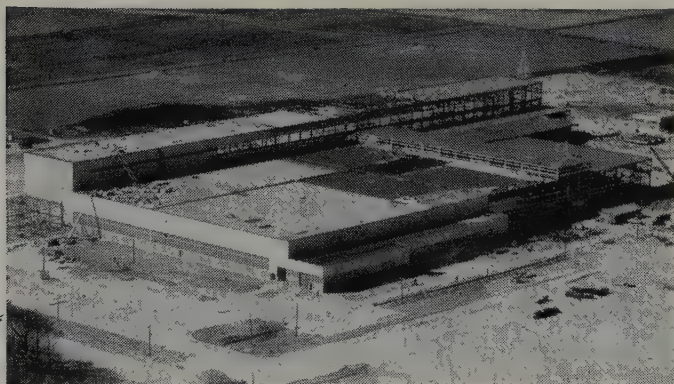
A
Merry Christmas
and a
Happy New Year



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used in Canada's largest transformer plant being built for **CANADIAN GENERAL ELECTRIC COMPANY LIMITED** at Guelph, Ontario, include approx. 150,000 square feet of STERNSON Empire Emery EMERUNDUM in the main building and STERNSON COLORHARD in the boiler house floor.

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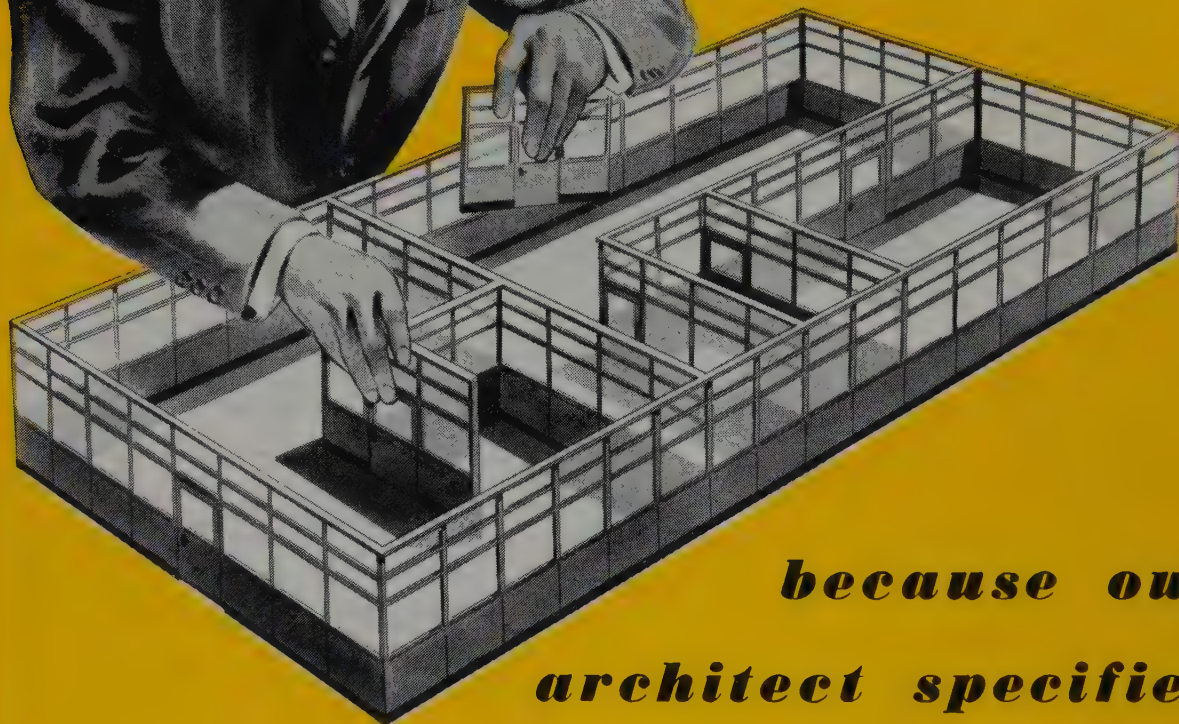
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architect specified***

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unit that --



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Cabinet Unit
gives you ALL 3

FOR year 'round comfort in large public rooms, nothing can match the economy and performance of Modine Cabinet Units.

With a single unit you get quick, positive, quiet distribution of heated or cooled air. Inexpensive accessories permit introduction, filtering, heating and distribution of fresh, outside air for ventilation.

And low cost is just one outstanding feature of Modine Cabinet Units. Their quiet beauty harmonizes with any interior.

No need for bulky, old-fashioned heating equipment—one cabinet usually replaces two or three cast iron radiators. Recessed in walls or concealed behind a partition or false ceiling, they make difficult remodeling jobs easy.

You can choose from five different models — some for heating plus cooling with chilled water... others for heating with steam or hot water only. Ask the Modine representative listed in your classified phone book for Bulletin 552. Or write Modine Manufacturing Company, 1500 DeKoven Avenue, Racine, Wisconsin.

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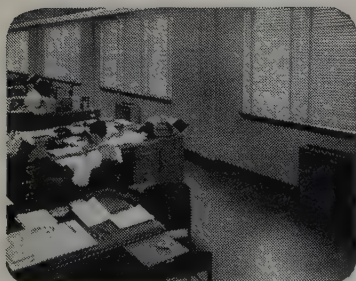
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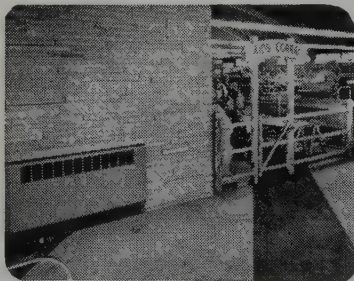
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C-1212

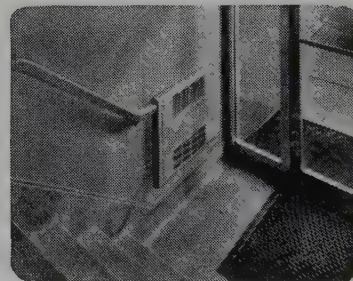
Here are three of many new construction or modernization possibilities



OFFICES. Year 'round comfort at lowest possible cost is provided this large office by economical Type BT Modine Cabinet Units.



STORES. Handsome as a convactor but with four to five times the capacity, Type BF Cabinet Unit heats modern store uniformly.



LOBBIES. Wintry blasts from opening doors are no problem in this apartment. Type FF cabinet effectively warms lobby.



COMING and GOING

BARCOL OVER DOORS **increase efficiency**

On one side of this modern freight handling warehouse, merchandise of every description constantly arrives, is stacked awaiting reshipment, and loaded from the opposite side onto transports bound for distant points.

Fifty-seven Barcol overhead doors keep this tremendous operation "on the move"—reducing delays, lowering freight handling costs.

At shipping and receiving entrances of warehouses and factory buildings, as well as in residential and commercial garages, smooth-operating, weathertight Barcol overhead doors can be depended upon to increase efficiency—"coming and going".

Include Barcol Overdoors by Eastern Steel in your future plans!

CONTRACT DIVISION

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P R O D U C T S L I M I T E D
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Facts by Pilkington about Glass

VOL. 3

No. 12

Glass Throughout
the World
VITROLITE



King Street station of Toronto Subway showing walls of Vitrolite

The walls of the stations of the Toronto Transportation Commission Subway are built up with Vitrolite-faced masonry. Vitrolite is an opaque structural glass which is available in a wide variety of colours.

In the subway the colours chosen were primrose, eggshell and grey, and the effect achieved is colourful and bright.

This type of installation provides walls that are impervious to moisture, permanent, and are

easy to keep clean. The Vitrolite was made in England, and was backed with 2" to 4" of light weight concrete by Murray Associates of Toronto. (See No's 17 and 18, Vol. 1 of this series.) It was erected in units of about 24" to 30" and to complete the contract, 200,000 square feet of Vitrolite was used.

Further information on this interesting product will be found in No's 10, 36, and 47, Vol. 1 of this series. Copies are available through any of our branches.

Pilkington Glass Limited

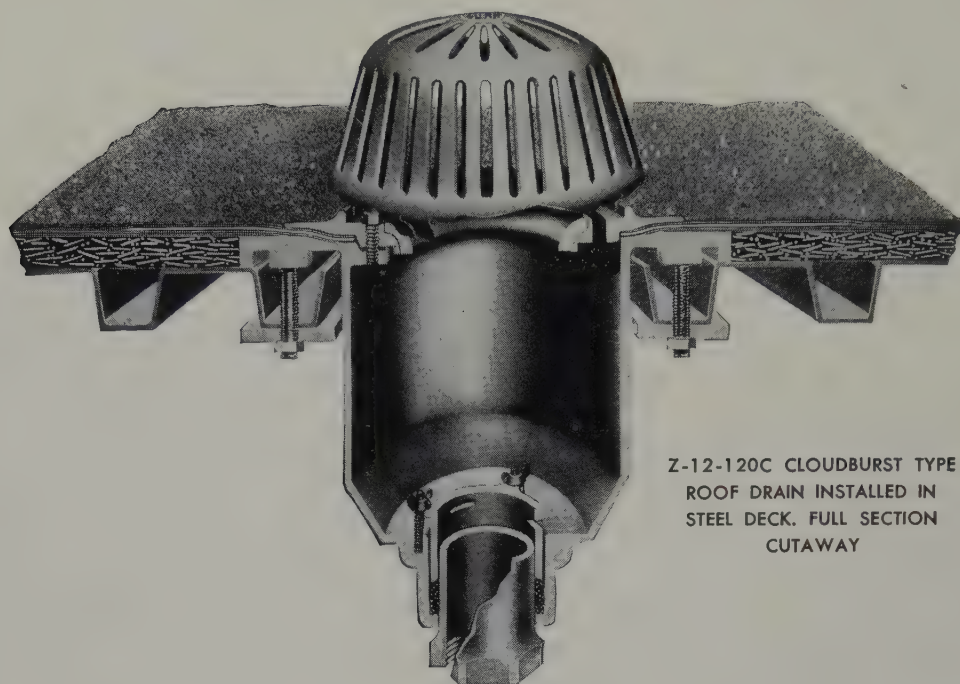


HEAD OFFICE — 165 BLOOR ST. E., TORONTO, ONTARIO

This is one of a series of data sheets compiled by the technical department of Pilkington Glass for the information of architectural students.

DRAINAGE PRODUCTS

AIR RELIEVED • CLOUDBURST TYPE ROOF DRAIN



Z-12-120C CLOUDBURST TYPE
ROOF DRAIN INSTALLED IN
STEEL DECK. FULL SECTION
CUTAWAY

Possibility of damage to roof areas by heavy loads of backed-up water which are a threat to roof safety is reduced by Zurn Air Relieved Cloudburst Type Roof Drains. A major improvement over conventional roof drains is the especially large and deep sump area, which acts as a temporary reservoir, eliminating swirling and splashing and allowing entrained air to escape before water enters drain pipe.

Maintenance of such a hydraulic head on downspouts compensates for pipe entrance friction factor and assures continuous flow at full capacity. Extra large, non-clogging mushroom type dome strainer increases free open area of straining surfaces up to 9:1 — a unique feature of Zurn Roof Drains.

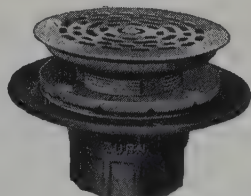
CP-5687

Damage to roof areas from backed-up and standing water due to freezing of water in drain inlet is reduced by the Zurn Steam Jacketed Roof Drain. The Steam chamber completely encircles sump area, providing radiation from inner surfaces. The Zurn Steam Jacketed Roof Drain is easily connected to building steam lines.



Z-200

Floor or shower drain provides positive seepage control and has non-clogging seepage slots in flashing collar and in vertically adjustable strainer. Strainer adjustable to plane of floor assuring a smooth, even finish. Regularly furnished with dura-coated cast iron body and clamping collar, Cast Zurn Nickel bronze adjustable strainer.



Z-506

The Zurn Easy Level floor drains are designed for quick, simple floor level adjustment at all times. These drains are suitable for either new or old construction and are particularly desirable for floor installations where resurfacing is required. Available for both normal traffic and extra heavy traffic loads.



Z-1326

Supremo Perfect Seal floor level cleanout for access through floors to drainage lines—used in industrial plants and other buildings where cleanout openings occur in heavy traffic open areas. Lugs permit adjustment to plane of finished floor for smooth even finish. Cover is non-slip scoriated Nickel Bronze and is adjustable.



CANADIAN ZURN ENGINEERING LTD.

PLUMBING • MARINE • INDUSTRIAL • POWER TRANSMISSION

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STEAM power for "THE LIGHT" STEAM



Sao Paulo to have largest boilers

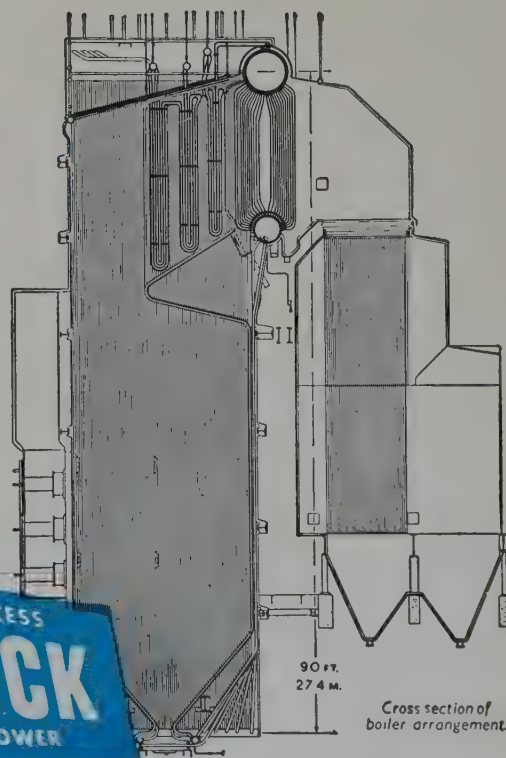
Sao Paulo Light and Power Company Limited is an operating subsidiary of the Canadian Corporation, Brazilian Traction, Light and Power Company Limited, known to Brazilians simply as "The Light". "The Light" supplies electric energy to the cities of Rio de Janeiro, Sao Paulo and Santos, as well as for electric railways and much of Brazilian industry, including the great Volta Redonda steel mill with its planned annual production of one million ingot tons.

In order to help satisfy the increasing demand on its hydro-electric system, "The Light" has ordered a new 160,000 kW thermal plant which will be located on the outskirts of Sao Paulo.

This will be equipped with the largest boilers in South America, two BABCOCK & WILCOX units, which are being manufactured by Babcock-Wilcox and Goldie-McCulloch Limited of Canada.

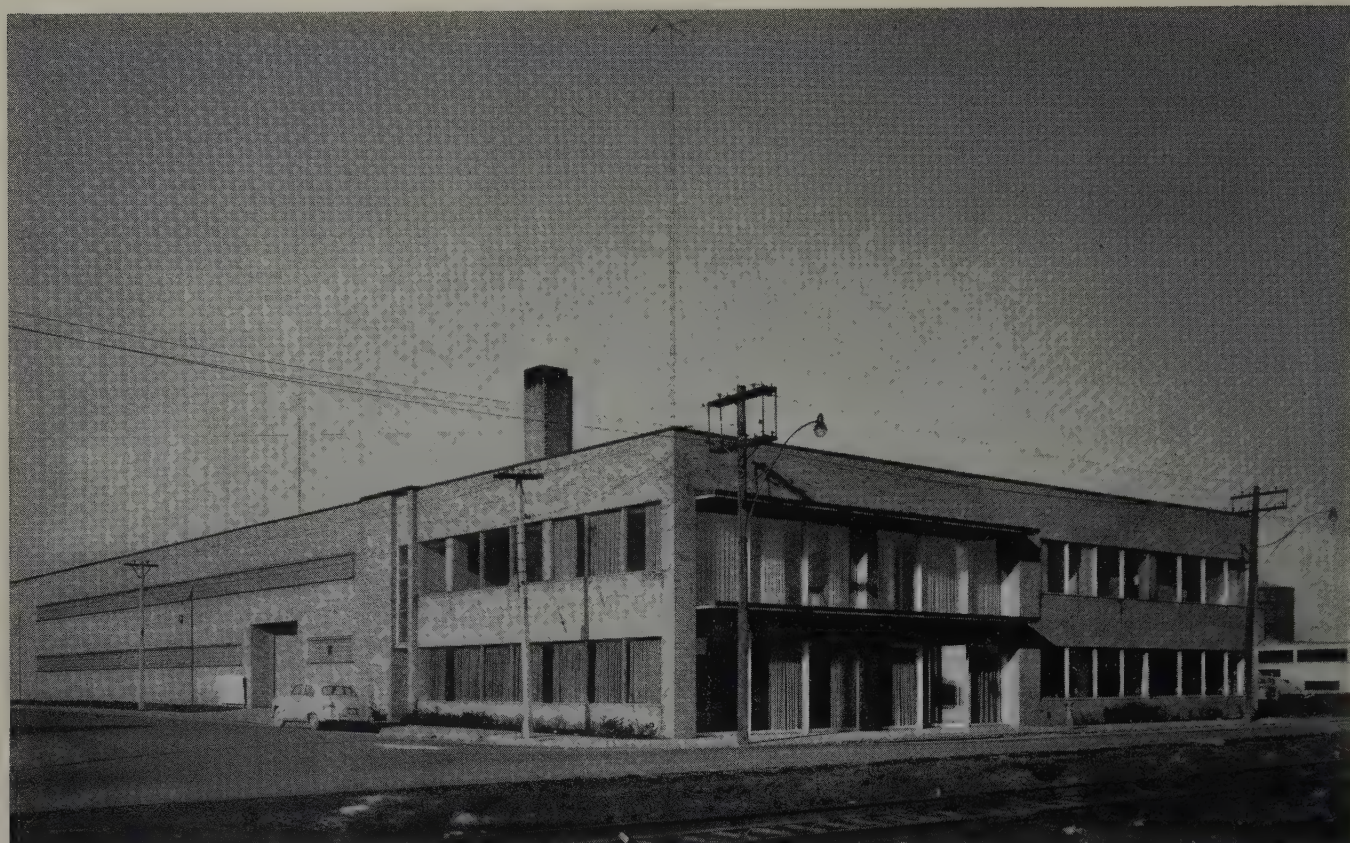
Each of these huge oil-fired boilers will supply 850,000 lb. of steam per hour, at a pressure of 850 pounds per square inch and a temperature of 925°F., to a turbine driving an 80,000 kW. hydrogen-cooled generator.

Design and procurement for this important plant are by Stone & Webster Engineering Corporation of Boston, Massachusetts, and construction and all activities in Brazil are being conducted by Stone & Webster Construction Company. Babcock & Wilcox (Caldeiras) S.A. Rio de Janeiro, will erect the boilers.



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MONTREAL - TORONTO - CALGARY - VANCOUVER



CRYSTAL GLASS & PLASTICS LIMITED, QUEEN'S QUAY, TORONTO

Gordon S. Adamson, *Architect*

OVER 90,000 SAND LIME BRICKS
USED FOR INTERIOR MASONRY IN THIS CONSTRUCTION

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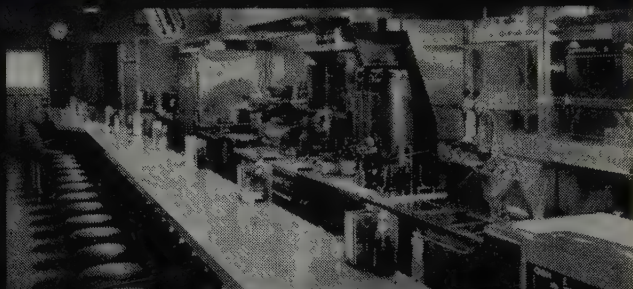
Palmer's Pharmacies, Bloor Street, Toronto



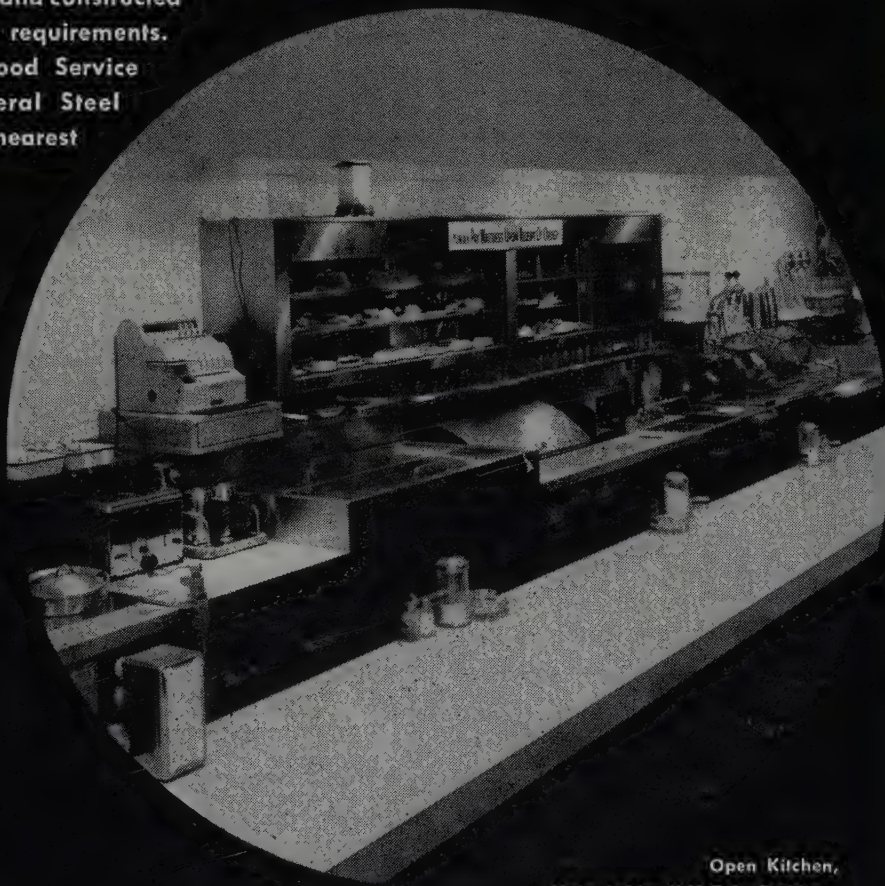
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**INCREASE EFFICIENCY—REDUCE
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The consistently high quality of GSW McClary open kitchen installations have won the approval of food handlers and buyers across Canada. Our record of hundreds of successful food service installations in Canada's leading hotels, hospitals, restaurants, factories and institutions is your guarantee of food service equipment properly designed and constructed to meet your own particular requirements. Address your inquiries to Food Service Equipment Division, General Steel Wares Ltd., Toronto, or our nearest branch office.



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Open Kitchen,
Main Lobby Y.M.C.A. Building
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General Steel Wares

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MONTREAL • TORONTO • LONDON • WINNIPEG • CALGARY • EDMONTON • VANCOUVER



Natco Handi-Grip Tile

For Exterior Load-Bearing Walls and Walls Faced with Brick

All Natco Handi-Grip Tile while comparatively light in weight have exceptional load-bearing qualities. The wide double shells insure tight, secure mortar joints which in turn guarantee high Structural rigidity. The enclosed dead air spaces throughout the wall insulate against the passage of heat and cold through the wall.

The tile itself, of hard burned shale, is highly impervious to moisture, and this combined with the elimination of continuous mortar joints assures a dry wall.

No other masonry construction which meets Toronto code requirements (1600 # or more per square inch gross area) for load-bearing strength, is as light in weight per cubic foot of wall.

13" Wall	Materials	CODE NUMBERS	QUANTITIES PER 100 SQ. FT.		
6th Course Bond	Brick Height		2 1/4"	2 3/8"	2 3/8"
	Brick Joint		1/2"	3/8"	1/2"
	Face Brick		698	698	658
	Tile NATCO				
	8" x 8 1/8" x 12" Stretcher	DD8812			67
	8" x 8 1/8" x 12" Header	DD8812H			67
	8" x 7 3/4" x 12" Stretcher	DD8812A	70	70	
	8" x 7 3/4" x 12" Header	DD8812HA	70	70	
	Mortar cu. ft.		12.5	8.4	11.8



NATIONAL FIRE PROOFING COMPANY OF CANADA, LIMITED

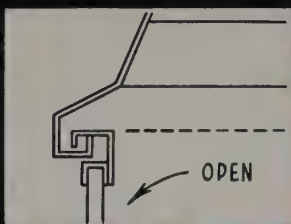
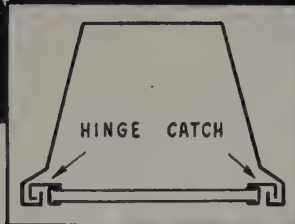
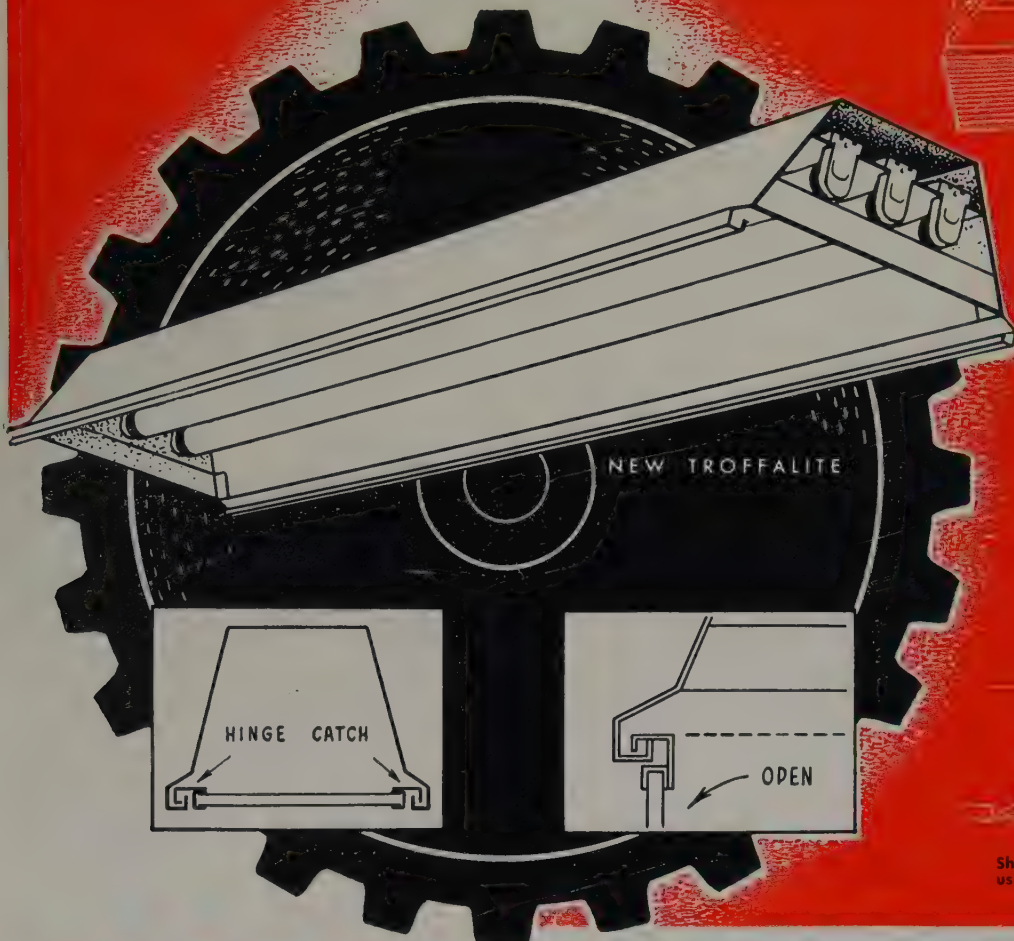
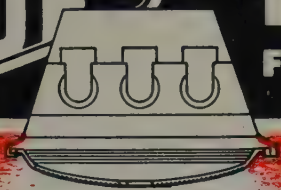
HAMILTON

TORONTO



LIGHTING

FROM INVISIBLE FIXTURES



Showing panel down for easy maintenance.



Showing T-Bar Installation and egg-crate louvre.



Showing standard steel channel and recessing hanger.



Showing plaster installation using side plaster strips and Corning glass lens.

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The New Troffalite—featuring the exclusive Wilson HINGELESS "HINGE" FRAME

Here's a recessed fluorescent light fixture, engineered for efficiency . . . designed for modern appearance . . . versatile in action . . . unsurpassed in light distribution.

The new **Troffalite** is available in 2 and 3-lamp standard 40-watt, 4' and 6' Slimline and the new 85-watt 5' lamp. There is a choice of open type, louvre, or various glass panels, all mounted in **Wilson's** unique Hingeless "Hinge" Frame, as illustrated above.

For a smooth, unbroken surface of ceiling and lighting at its best, specify the new **Wilson Troffalite**.

For complete data write for Catalogue, Section No. 1.

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"HEAL" LINOVECTOR



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The new "Heal" Catalogue, which is just off the press gives these I-B-R ratings together with complete technical data on Linovector.

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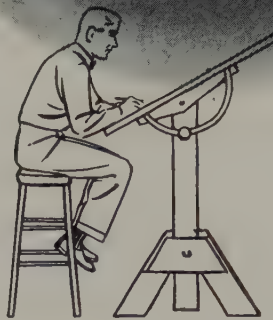
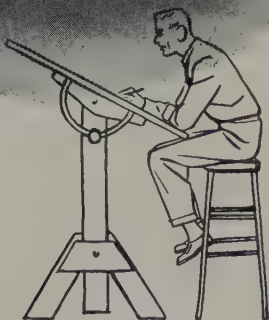
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all the best for
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A black and white photograph of a person's hands working on a piece of hardware, possibly a lock or latch, on a workbench. Various tools and parts are visible on the bench. The Bellville Hardware of Distinction logo is overlaid on the right side of the image.

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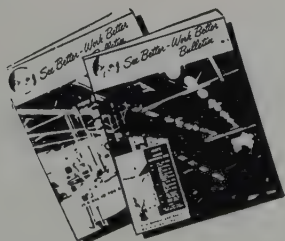


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Says SYD. W. STOCK, P. ENG.

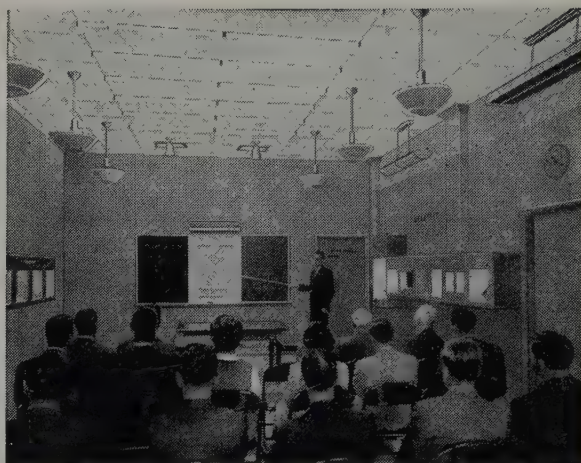
SYD. W. STOCK, B.Sc. (E.E.) for 28 years a lighting authority with the Lighting Service Department and Lighting Institute of C.G.E. Syd is Supervisor, Application Engineering Unit of the Lighting Institute.

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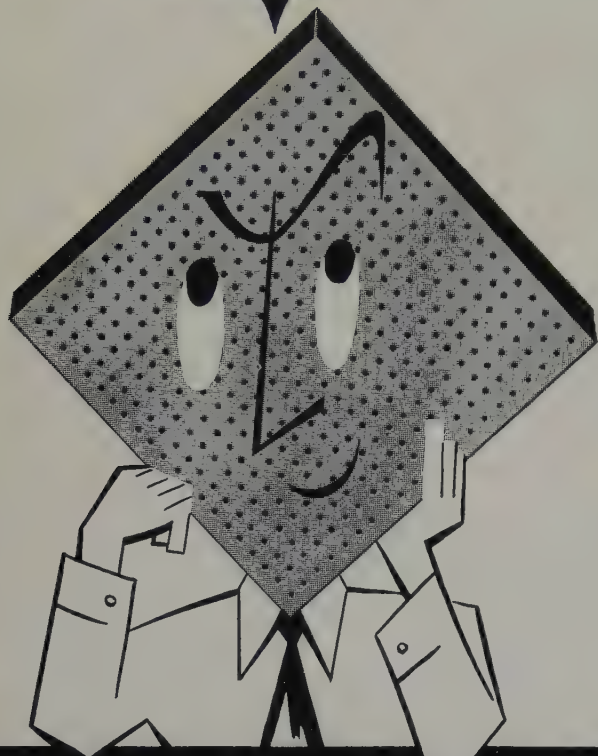
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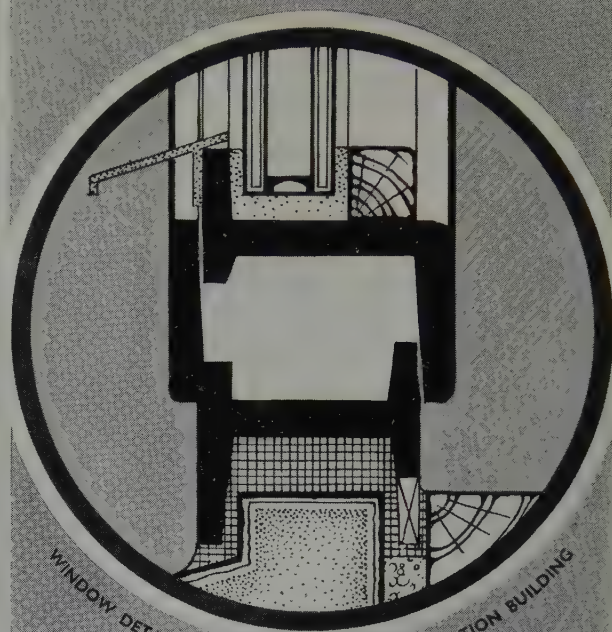
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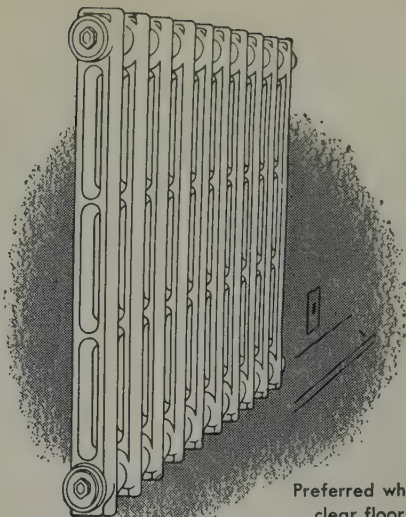
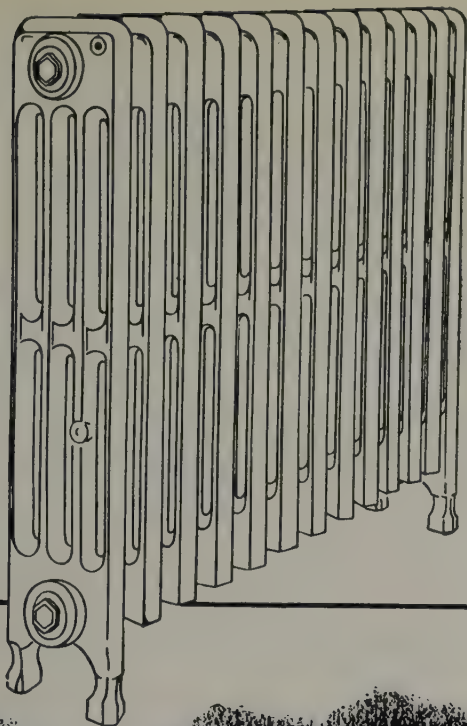
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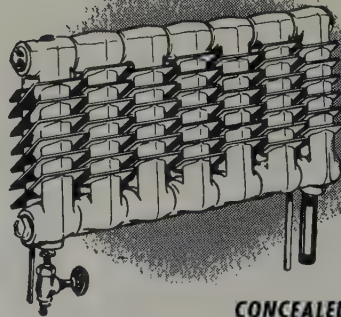
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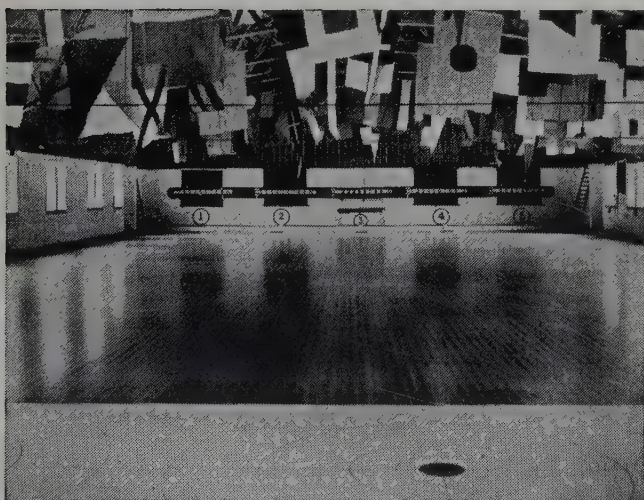
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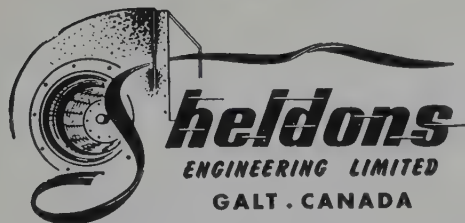
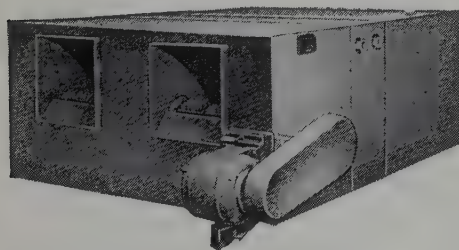
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Fashion goes FLOOR-WARD

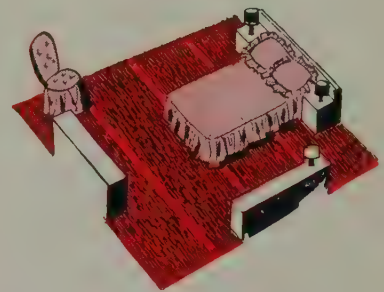
Modern living and planning spotlight the floor—endorse the *functional* features pioneered and perfected in

linoleum floors

by DOMINION



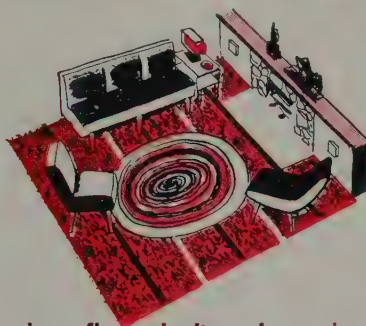
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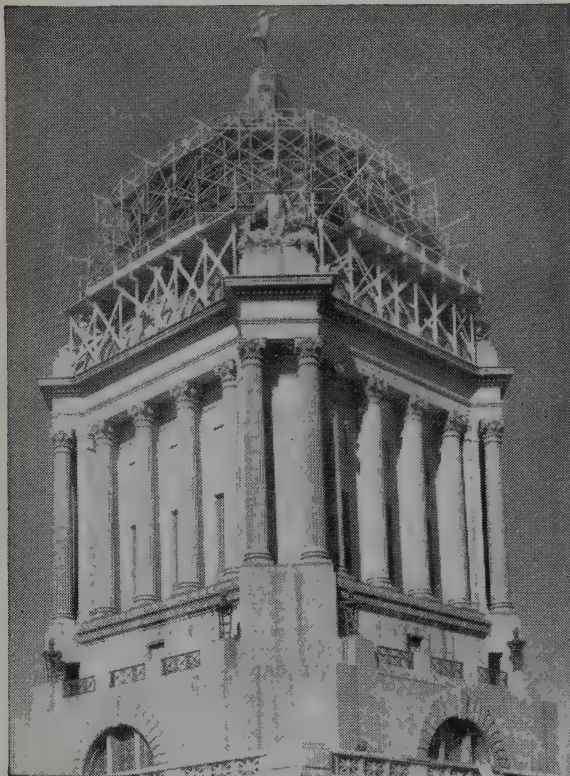


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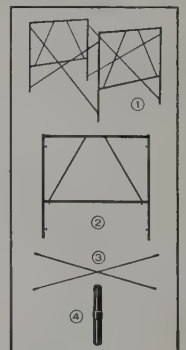
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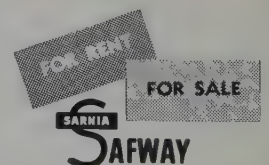
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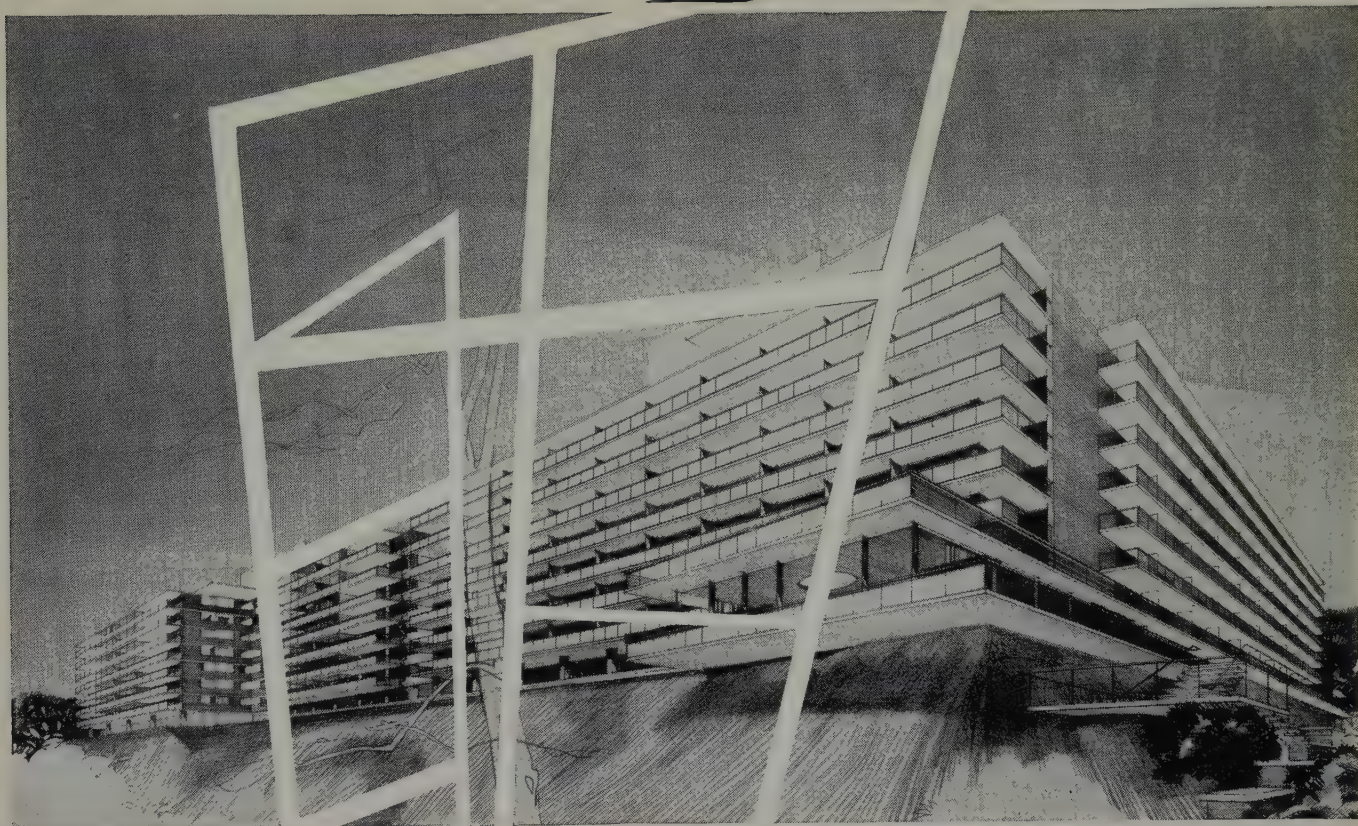


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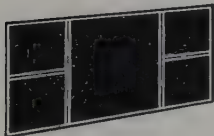
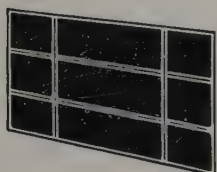
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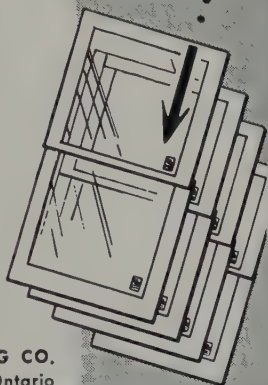
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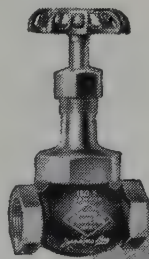
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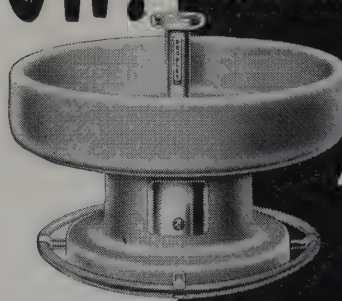
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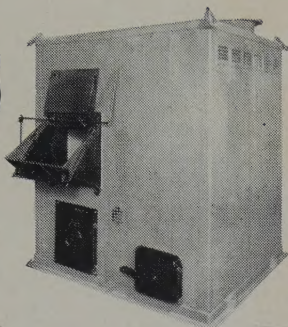
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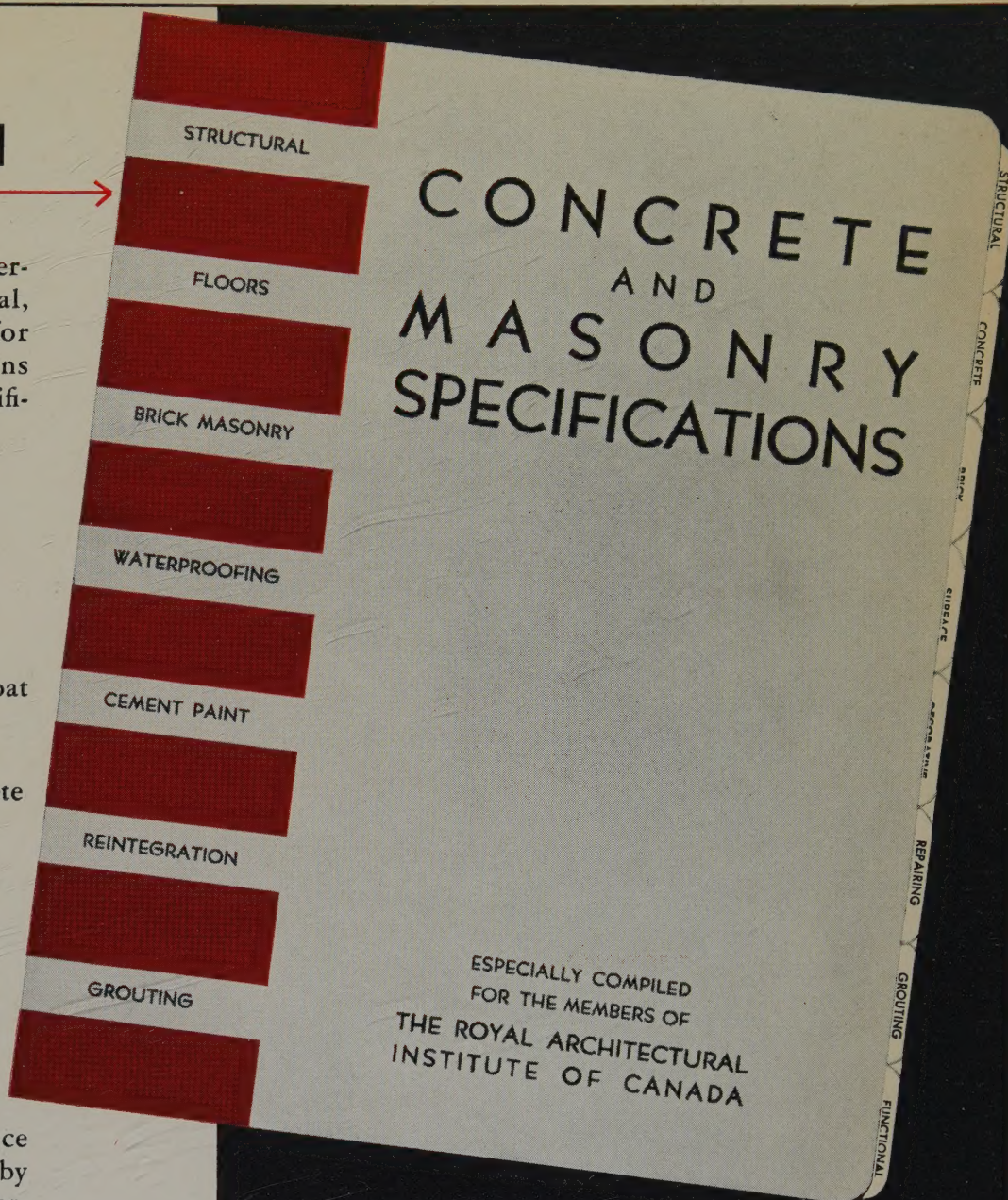
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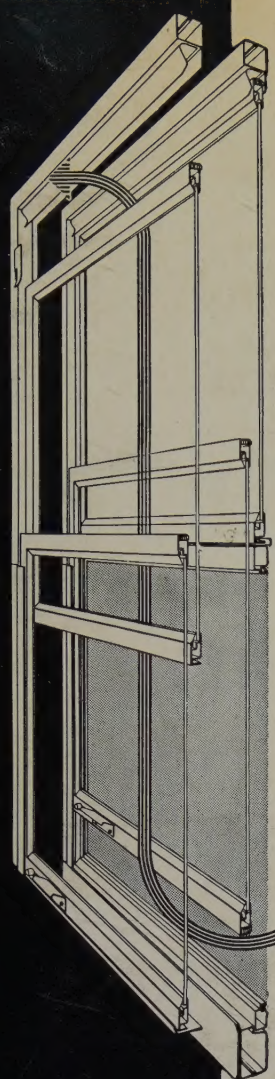
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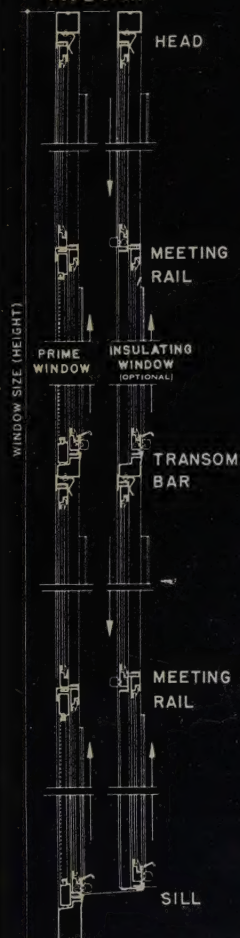


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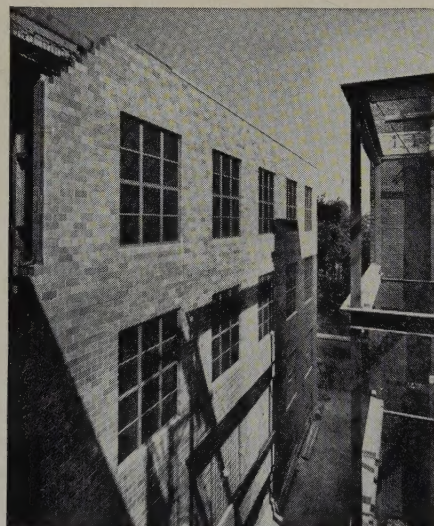
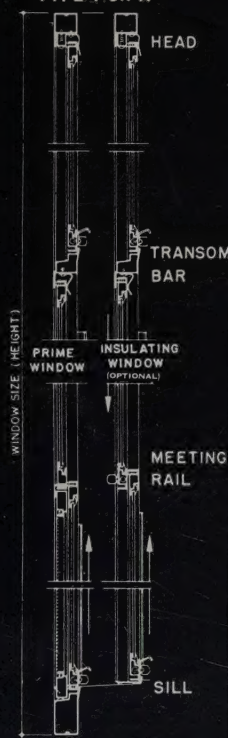


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